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AGRICULTURAL MARKETING IN LESOTHO

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AND B.M. SWALLOW

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Agricultural Marketing in Lesotho

by
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INTRODUCTION

The primary purpose of the report is to present the results of research carried out during the first phase of the project on Agricultural Marketing in Lesotho. This project which is described more completely in Appendix A, was organized to focus on agricultural marketing problems in Lesotho. Several sectors of Lesotho's agriculture were the area of focus: livestock, wool and mohair, dairy and vegetables. Research was carried out in Lesotho by a resident team of researchers who worked in collaboration with the Research Division of the Ministry of Agriculture. Research was also carried out as dissertations for Masters of Science Degrees at the University of Saskatchewan, Canada.

Although the focus of the marketing and related research is on Lesotho, the theoretical and conceptual models, methodology and results have implications beyond that of Lesotho. Many of the problems that confront Lesotho can be found in other parts of Africa and the agricultural economies of the developing world.

For most of Africa agricultural productivity has not kept pace with the rate of growth of population. The reasons are numerous: adverse climatic conditions, political instability, lack of capital for investment, land tenure, and others. While a high percentage of Africa's population continue to live in rural areas, an increasing rate of urbanization places a further burden on the economy. This calls for the development of a marketing system to assemble agricultural products from rural areas and in some cases transform primary products into food. This calls for investment in transportation, storage and processing facilities. However, much more is required.

As experience has shown, too often economic and agricultural policies in developing countries have tended to be consumer, rather than producer oriented. Low prices, overvalued exchange rates, and food aid have stifled the incentive of producers. Capital investments too often were focused on an industrial strategy for economic development. Often where agricultural development projects were introduced, the focus was primarily on increasing production. Where marketing was neglected and not made an integral part of the project, surplus production could not reach consumers. As a result producers became discouraged and the project failed.

The marketing project in Lesotho operated from several philosophies. First is that of "appropriate marketing or appropriate markets" meaning that the marketing system must be tailored to the particular situation. The type of commodity, location, availability of infrastructure, cultural traditions of people, financial, legal and business institutions determine what marketing approach is "best" suited to development. Second, that research must be developed and carried out in cooperation with the users, particularly government.

The report contains seven chapters. The first two chapters provide the setting for the research that is reported in the last four chapters. In Chapter 1, M.

Mochebelele and N. Mokitimi describe the main characteristics of the Lesotho economy. This includes data on the macro and micro economies as well as the relationships of the Lesotho economy with that of the Republic of South Africa (RSA). Special attention is paid to the agricultural sector with a description of crops, livestock, land tenure, marketing and trade and the role of government.

In Chapter 2, Gary Storey outlines in theoretical terms the role and importance of marketing and marketing research in development. Discussion focuses on the reasons for market failure in development. The importance of institutions is discussed along with the role of education in institutional change. Following is an examination of various approaches to market performance evaluation. A final section presents a model of the relationship between the Lesotho/RSA economies with a focus on trade and the overall implications for agriculture in Lesotho.

In Chapter 3, Brent Swallow reports on the major research work carried out in Lesotho for the report, the analysis of the livestock industry in the context of rangeland utilization with overall implications for marketing. In this context the results have importance for similar livestock/range problems elsewhere in Africa. The specific production/marketing system in Lesotho is described. Results of a household survey complete with partial budgets for livestock are presented. Of particular importance is the presentation of the open access and common property models in dynamic terms. They are developed in the context of the Lesotho situation. This is further extended to questions of policy and regulation.

In Chapter 4, Malijeng Ngqaleni examines marketing for vegetable production in Lesotho. Results are drawn from two sources, initial research carried out in Lesotho and work as part of her M.Sc. dissertation. Of particular interest is the dependence of Lesotho on the RSA for vegetables. The efforts by the government to reduce the dependency and the associated problems and implications for development are discussed. The chapter reports on the research which analyzed the constraints to increased production through a vertical market systems analysis.

In Chapter 5, Motsamai Mochebelele presents the results of research carried out as part of his M.Sc. dissertation. The focus of the study was to examine alternative economic and trade policies which have a bearing on Lesotho's dairy industry and its development. The structure of the dairy industry is described. The methodology which incorporated a step-wise linear programming model is presented along with the validated benchmark model. The results of six case studies of alternative policies are presented in welfare economic terms with further implications for transportation and processing costs, and regional prices.

In Chapter 6, None Mokitimi examines the wool and mohair production and marketing system in Lesotho. The work is also largely based on his M.Sc. dissertation. Whereas Lesotho is a net importer of most agricultural and food products, it has historically been a net exporter of wool and mohair. Declining productivity of wool and

mohair provide the basis for the study with a focus on the performance of the marketing system. The structure of the marketing system is described with emphasis on the duo-trading system that existed in earlier periods. Although the research has a historical perspective, the present marketing system is evaluated.

In Chapter 7, Gary Storey provides a summary of the overall study and discusses some of the implications for agricultural development in Lesotho further research.

FOREWORD

The International Development Research Centre has been supporting economic policy research in Eastern and Southern Africa for over ten years. One of our largest and most ambitious projects in that region has been devoted to agricultural marketing in Lesotho, an analysis of the constraints and policy options, as well as the strengthening of local research capacity. This book is the outcome of that project's first phase.

It has long been apparent that if Lesotho is ever to reduce its dependence on wage remittances from workers based in South Africa, and satisfy the needs of those who stay behind, it will have to develop its agricultural sector. However, it was only recently that it became evident that marketing issues had been neglected. This project was launched to help fill that void.

I am pleased to say that in spite of scarce local capacity and early personnel changes, the project has made an important contribution. Researchers worked closely with government officials to identify priority areas and develop relevant policy recommendations, many of which subsequently influenced government plans as well as those of the donors. Furthermore, this process helped underline to policy-makers the potential role of university-based researchers, leading to expanded collaboration in recent years. Finally, local capacity was considerably reinforced as witnessed by the dominant role played by Basotho researchers in the project's second phase.

Given this successful experience, it was felt that the results should be shared with a wider audience. Agricultural development generally, and marketing more specifically, is a major priority throughout sub-Saharan Africa and the issues facing Lesotho should sound many familiar bells for readers interested in other parts of the continent. The authors of this book have worked hard to make a big splash in a small pond. With this publication, I expect they may also generate a few ripples in the ocean beyond.

Philip English
Program Officer
Economic Policy Program
Social Sciences Division

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We want to especially thank IDRC for the patience and willingness to be flexible in meeting the needs of the project. Many individuals at IDRC were involved in the project but several require special mention: Steven Langdon (now a Member of Parliament in the Canadian Government), David King, David Glover and Philip English, Jeffrey Fine, Paul Vitta, Gordon Banta and Issa Omari.

We also want to thank the two institutions that cooperated in the project through providing in particular managerial and intellectual assistance: the Institute of Southern Africa Studies (ISAS) of the National University of Lesotho and the Agricultural Economics Department of the University of Saskatchewan, Canada. To the many faculty and staff of these two institutions, we owe a great deal. We would especially like to acknowledge the contributions of Michael Safeli who was then Director of ISAS during most of the first phase of the project and Kwesi Prah the then Head of the Research Division of ISAS who along with Gary Storey served as Co-Directors of the project and also to Gwen Malahlela as Director of ISAS during the second phase of the project, who was a source of encouragement for the publication of this report.

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I

THE SETTING: THE LESOTHO ECONOMY

Motsamai Mochebelele and Nonc Mokitimi

The purpose of the chapter is to present the major characteristics of Lesotho's economy. The exercise was fulfilled through an overview of key geographic and climatological features, major economic parameters and the state of economic development. Agriculture, being the major focus of the bulletin, dominates the content of the chapter.

1.1 The Background to Lesotho's Economy

The Kingdom of Lesotho, formerly known as Basutoland, gained its independence from Britain in 1966 as a multi-party state. It is a geographical enclave of a single country, the Republic of South Africa (RSA). The country lies between the 28° and 31° latitudes in the south and is bordered by the 27° and 30° eastern longitudes in Southern Africa. Of its 30,355 sq. km. land area, only 13 percent is deemed suitable for crop production while the rest consists of predominantly rocky mountains and foothills. For the entire country, the altitude is no less than 1,500 metres above sea level with the highest peak rising to 3,482 metres above sea level. Lesotho thus has the highest peak in Southern Africa forming part of its Maluti mountain range. About a quarter of the country in the west is lowlands ranging from 1,524 to 1,829 metres in altitude.

The country comprises four major regions namely, the Lowlands, Senqu River Valley, the Foothills and the Mountains. The vast differences in topography result in varying climatic conditions throughout the country. Winters are cold and dry, becoming harsher in the highlands where mountains are usually snow-clad during June, July and August. Summers are generally warmer but cool in the highlands due to altitude. Temperatures in the lowlands vary from a maximum of 32°C or even higher in summer to a minimum of -20° C in winter. The cold months are May, June, July and August with July having the lowest daily average temperatures.

The normal annual rainfall averages 750 mm but varies considerably according to areas, with the highlands where average annual rainfall is 760 mm receiving most of the rain. The rainy season mainly runs from October to March. January /February receive most rain. Rain typically falls with high intensity which has contributed to a serious problem of erosion which is further exacerbated by the topography of the country.

At independence the de facto population of Lesotho stood at 825,000 while the de jure population was 970,000. Migrant mine workers to RSA are the major

contributing factor to the differences in de jure and de facto population statistics. During the inter-censal period from independence in 1966 and 1976, the annual population growth rate averaged 2.3 percent. For the 1976 - 1986 inter-censal period, the growth rate had accelerated to 2.6 percent per annum and has been sustained at that level. The results of the 1986 population census showed that 48.2 percent of the population consisted of males while the remaining 51.8 percent was female. At present, the population is estimated to be above 1.6 million and projections are that there will be 2 million people by the year 2,000.

More than 80 percent of the population reside in the rural areas, and most of them have resources in the form of land and/or livestock. The ownership of resources is increasingly threatened by the population growth rate. Future generations are destined to lose the opportunity to own land. The land area is in limited supply and is gradually deteriorating with soil erosion decreasing its productivity. The incessant increase in population density per sq. km of arable land highlights the problem. For the total land area, population density increased from 40 persons per square kilometer in 1976 to 51 persons in 1986. This marks an increase of 28 percent in population density within a period of ten years.

According to the United Nations, Lesotho is rated one of the world's poorest nations. In 1975, the Gross Domestic Product (GDP) per capita was M169[1] and M746 by 1985. Table 1.1 shows the precarious economic state of Lesotho through major economic indicators. A number of reflections are evident from the table.

Over the eleven year period (1975 - 1985), final consumption expenditure is consistently in excess of the GDP. Similarly, imports were well above GDP being 2 percent higher in 1975 and even higher at 3 percent in 1985. It is further evident that imports constitute over 50 percent of the total resources in all years under consideration. The indicators invariably point to the fact that the nation lives beyond its means, a factor which renders it vulnerable to external economic and political shocks.

1.2 Employment and Labour Migration

The wage employment in Lesotho is dominated by migrant workers who work in the RSA, mostly in the gold mines. More than 50 percent of the male labour force is employed in RSA where average wages are relatively higher than those available in Lesotho. This renders local employment to be a residual claimant of the total available male labour force within the ages of 20 and 45 years. It is estimated that about 70 percent of agricultural development work in the rural areas is carried out by women. But their efforts are often said to be undermined by their legal status. For instance, married women require husband's approval to undertake a legal agreement such as acquiring a loan from the bank to finance projects.

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[1] M is the official symbol for the local currency, Maloti.

Table 1.1: Resources and Expenditure 1975 - 1985 (Million Maloti)

	RESOURCES					EXPENDITURE			
Year	GNP at Market Prices	Net Factor Income from Abroad	GDP at Market Prices	Imports of Goods and Services	Total	Private Consump.	Government Consump.	Gross Capit. Form and Servi.	Export of Goods
1975	199.7	89.1	110.6	113.2	223.8	167.2	21.3	20.7	14.6
1976	247.7	119.3	128.4	174.7	303.1	210.5	24.9	46.4	21.3
1977	308.0	139.9	168.1	185.3	353.4	264.2	29.2	42.0	18.0
1978	385.1	153.3	231.8	206.3	438.1	300.7	40.9	60.1	36.4
1979	422.5	178.2	244.3	296.4	540.7	353.6	52.5	84.6	50.0
1980	501.5	205.0	297.3	359.5	656.8	395.2	99.0	100.7	61.9
1981	583.2	254.8	328.4	433.6	762.0	473.7	108.6	116.3	63.4
1982	744.8	375.6	369.2	524.2	893.4	596.4	99.0	140.5	57.5
1983	833.5	438.4	395.1	579.8	974.9	710.0	111.2	100.5	53.2
1984	978.3	507.6	470.7	671.0	1141.7	794.3	124.9	160.7	61.8
1985	1119.1	548.0	571.1	733.6	1304.7	878.0	168.0	183.0	75.4

Source: Bureau of Statistics, Statistical Yearbook 1987.

1.2.1 Migrant Miners Employment

From 1978 there has been a tendency by the RSA mining industry to decrease the numbers of migrant workers from Lesotho. The decline featured prominently between 1980 to 1985. Nevertheless migrant wage incomes remain a permanent feature of Lesotho's economy. The contribution of mine incomes constitutes a significant proportion of the GNP and is generally on the increase despite the stagnation in numbers employed. In 1970/71 the mine income's share of the GNP was 20.8 percent rising to 39.1 percent in 1977/78 and even higher by 1984/85 where it constituted 51.2 percent of the GNP. Table 1.2 shows that mine earnings had increased from 27.6 million maloti in 1977 to 279.5 million maloti by 1986.

If the tendency to decrease the number of migrant mine workers from Lesotho continues, serious repercussions should be expected to the GNP and the up-swing in unemployment. According to the 1986 population census, landlessness is increasing in Lesotho.

Given the limited capacity of the agricultural sector and high dependence on mine wages for most households, the worsening employment market in the RSA suggests urgent job creation opportunities within Lesotho. Preliminary results of the

Table 1.2: Number of Migrant Mine Workers, Deferred Pay and Remittance Payments 1977 -1986

Year	No. of Employees	Deferred Pay* (M. Maloti)	Remittance Payments (M. Maloti)	Total Mine Incomes
1977	128,941	16.6	11.0	27.6
1978	124,491	20.3	12.9	33.2
1979	124,393	22.7	15.4	38.1
1980	120,733	24.4	17.7	42.1
1981	123,539	35.8	26.9	62.7
1982	117,462	76.7	51.0	127.7
1983	115,320	103.6	74.2	177.8
1984	114,071	123.5	82.9	206.4
1985	116,513	131.5	93.8	225.3
1986	121,450	174.8	104.7	279.5

* Deferred pay is the share of the miners incomes constituting 60 percent of the total. However leakages have been experienced. This money is automatically withheld and deposited in a Lesotho Bank which disburses it on demand when the miners are back in Lesotho.

Source: Bureau of Statistics, Statistical Yearbook. 1987.

1985/86 Labour Force Survey (as reported in the 1987 statistical yearbook) indicate that about 36 percent of the Basotho households derive their incomes from miners' incomes. This shows a very high dependence on foreign earnings such that the sustainability and stability of Basotho's socio-economic development is highly in doubt. The apparent threat to continued employment of Basotho labourers is further amplified by the shortening of their employment contracts. In 1984 the average contract period was 16.9 months. Towards the end of the first half of 1988, the average contract length was down to just over a year.

1.2.2 Participation in the Labour Force

It was earlier indicated that about 70 percent of the agricultural development work is performed by females. However, only 37.1 percent of female population participates in the labour force while a higher ratio (76.3 percent) of male population participates in the labour force (Table 1.3). The total participation ratio for both sexes amounts to 55.8 percent which is low. Unemployment rates are generally high at all age

Table 1.3: Labour Force Participation and Unemployment Rates by Age and Sex.

Age Group	Participation Rates %			Unemployment Rates %		
	Male	Female	Total	Male	Female	Total
12 - 19	40.7	17.5	28.5	28.9	37.1	31.6
20 - 34	90.8	47.1	68.8	22.1	29.4	24.6
35 - 54	94.7	49.5	71.0	16.1	19.6	17.3
55 - Over	77.5	31.9	51.6	25.9	17.1	22.8
Not Stated	27.9	2.8	10.9	0.0	0.0	0.0
Total	76.3	37.1	55.8	21.8	25.4	23.0

Source: Bureau of Statistics, Socio-Economic Indicators of Lesotho. 1987.

levels for females giving an average of 25.4 percent compared to 21.8 percent of males. The high unemployment rate for females calls for aggressive programmes for job creation in the rural areas where the bulk of them reside. Since most of the wage-earning jobs tend to favour male gender, there is a need for expansion of agro-industries which tend to seek female employees.

Comparable statistics in the 1976 population census showed 78 percent participation rate by males and 35 percent for females. This shows that there has since been a slight improvement in the participation rate of females. On the contrary, the participation rate of males declined marginally. The increase in women's participation rate could be due to increased presence of self-help projects and village based tapestry and handicraft employment.

The labour participation rates between the urban and rural areas for males are fairly uniform. The urban employment rate is only marginally higher by 3 percent. A significant disparity exists for females in favour of the urban dwellers. The labour participation rate for female urban residents is as high as 56.0 percent compared to the rural ratio of 34.2 percent. Increasing pressure on resources in the rural areas and diminishing employment opportunities is one of the primary factors which have resulted in increasing rural-urban immigration. This phenomenon has become one of the pressing policy challenges facing Africa today. However, African governments have not as yet fully addressed the rural-urban migration influx.

1.3 Regional Institutional Arrangements

Lesotho is a signatory to two longstanding regional economic agreements. In 1910, Lesotho became party to the Southern African Customs Union Agreement made up of Botswana, Lesotho, Swaziland and the RSA. The second regional agreement was concerned with the Rand Monetary Area which has since been renamed the Common Monetary Area. Botswana, which was formerly a member of the rand area, withdrew and established an independent currency before the agreement was formalized.

1.3.1 The Southern African Customs Union

The Southern African Customs Union Agreement (SACUA) was revised in 1969 but did not change the dependence of Botswana, Lesotho and Swaziland (normally referred to as BLS countries) and the domination of RSA. While there is a unique inequality between the BLS and RSA, the compensation from SACUA forms an important source of revenues to the BLS countries. Under the agreement, there should be a free flow of commodities between the four member countries.

The trend shows a continuous increase in revenue earnings to Lesotho from the customs revenue pool. After independence in 1967, receipts to Lesotho were 1.9 million maloti while by the turn of the decade they amounted to 6.3 million maloti. In 1975, the customs revenue was 15.2 million maloti forming 7.6 percent of the GNP and 55.4 percent of the GDP. By 1983 the revenue (161.1 million maloti) was 18.2 percent of the GNP and 47 percent of the GDP. In general, since 1977 the customs receipts have maintained a level that forms between 10 and 20 percent of the GNP. The picture shows substantial benefits to Lesotho from the revenue pool, as is the case for the other two sister countries. However, the BLS countries have consistently called for an increase in their overall share from the pool. In all, they jointly share a very insignificant ratio of the overall SACU revenue. The bulk of the revenue accrues to RSA which unilaterally administers the regional import tariffs.

1.3.2 Monetary Arrangements

The BLS (all formerly British Protectorates) countries and RSA had shared common currency (£ Sterling) since the British colonial rule. The South African Reserve Bank administered the issue of the currency until the introduction of the RSA Rand in 1961 when the pound was withdrawn from circulation. The BLS countries naturally followed and the South African Rand became the legal tender in the sub-region, hence the Rand Monetary Area.

The South African Reserve Bank continued to serve as the regional Central Bank. Ultimate withdrawal of Botswana from the RMA in the early 1970s left Lesotho and Swaziland. Even though the BLS countries used the rand as their legal tender since its inception in 1961, the formalized agreement of the rand as a legal tender was entered into in 1974 with the exception of Botswana. However, Botswana remains a

member of the Southern African Customs Union.

Under the formalized RMA agreement the South African Reserve Bank continued to be responsible for the management of the rand and the rand exchange reserves. The agreement further affords all parties to maintain independent monetary policy and control of their financial institutions. However, in practice, RSA as the political and economic power is the principal beneficiary and influences policy initiatives of the weaker partners. The smaller economies have not in practice been able to exercise independent monetary policy. This is primarily because their economic development and financial institutions are fully institutionalized into the RSA economy.

Even though the agreement did allow for different national tenders in Lesotho and Swaziland, it was restrictive. As articulated in Article 2 of the 1974 agreement:

> No currency other than the Rand currency..... shall be legal tender in the Rand Monetary Area ..... The Governments of Lesotho and Swaziland shall each have the right to issue currency in the form of (a) national notes and coin, and (b) commemorative coin, in nominal amounts, but such currency shall constitute legal tender only in its respective area ..... Provided that any arrangements in respect of any national note and coin issue governed by this Agreement shall be subject to prior agreement between the government of South Africa and the issuing Government.

The article, like other similar ones, reflects the discretion and enormous power RSA had on the monetary policy and the agreement in general. It emphasizes that the smaller economies should individually enter bilateral agreements with RSA before they engage in major policy changes. Through the instrument, South African capital and money markets have benefited substantially from the inflow of capital from the smaller dependent parties.

In 1980 a financial institution was established in Lesotho which came to be known as the Lesotho Monetary Authority. Following the amendment of the Lesotho Monetary Authority Act in August 1982, the Lesotho Monetary Authority assumed the status of a Central Bank of Lesotho.

At the time when the former Lesotho Monetary Authority was established (1980) a national currency, Maloti was also introduced.[2] It became a legal tender in Lesotho and continues to circulate with the rand, which remains the regional legal tender

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[2] Loti is singular for maloti.

according to the tripartite agreement. As clearly restricted in the agreement, Maloti is only a legal tender in Lesotho.

The pegging of Loti to the Rand where they trade at par (1 loti: 1 Rand) exposed it to severe decline in exchange value in the 1980's when the rand exchange value declined. Botswana has, on the other hand, maintained a high exchange rate on its currency compared to its two sister countries. It pursues an independent monetary policy which is free of the repercussions resulting from the RSA economic difficulties. In essence the issuing of maloti in Lesotho has not resulted in economic gains other than perhaps meeting the political aspirations which foster the sense of sovereignty and nationalism.

The Rand Monetary Area agreement was amended and that resulted in its being renamed the Common Monetary Area (CMA) in 1986. The cause for change was Swaziland's initiative to delink its currency from the rand. But in practice the rand continues to circulate in Swaziland at par with Emalangeni even though technically it is not a legal tender. The reason for Swaziland to delink its currency from the rand was the deteriorating exchange rate of rand internationally and the desire to maintain an independent monetary policy.

From 1984 Swaziland had maintained sufficient external reserves to guarantee a high value for its currency but had to undervalue it consistently with the rand to which it was pegged. Inflation was imported from RSA and the country was not in a position to absorb it through exchange rate manipulation as did Botswana. It is highly likely that Lesotho may follow suit should the exchange rate of rand continue to worsen. But the decision should be much harder for Lesotho because of its most unfortunate geographic position. Since as it is fully engulfed by the RSA, cordial relations are a natural course for Lesotho's policy.

1.4 Foreign Trade

The Southern African Customs Union area is the centerpiece of Lesotho's external trade for obvious reasons mentioned earlier. Consistently over 90 percent of the imports of Lesotho come from the customs union area with marginal imports from other parts of the world (Table 1.4). Within SACUA, the bulk of the trade is with RSA which accounts for almost all the imports. Imports from the EEC are the next in ranking after SACUA.

For exports, SACUA is an insignificant market for Lesotho's commodities. However, in the late 1980's the exports to SACUA, primarily to RSA, have increased markedly. The prime reason has been the increase in manufactured goods, mainly foot-wear and clothing. This marks the period when sanctions against RSA resulted in some of the firms relocating to Lesotho in the second half of the 1981 - 1990 decade. The major export market is the EEC. Preliminary figures for 1986, 1987 and 1988 also show

Table 1.4: Total Imports C.I.F. and Total Exports FOB (,000 Maloti) 1981 - 1985

Group Country	1981		1982		1983		1984		1985	
	Impts	Expts	Impts	Expts	Impts	Expts	Impts	Expts	Impts	Expts
SACU	426,730	20,130	548,520	16,622	598,622	30,041	670,602	19,713	755,697	43,318
OTHER AFRICA	107	170	192	405	1,047	1,588	520	169	188	337
EEC	6,789	4,462	4,890	44	8,692	1,645	11,159	18,780	18,958	4,871
OTHER EUROPE	488	18,034	824	15,200	641	152	10,007	86	10,355	464
NORTH AMERICA	1,179	91	20,170	136	2,606	898	5,745	250	6,894	499
OTHER AMERICA	-	-	-	-	-	376	-	37	-	-
ASIA	3,961	219	3,346	605	2,988	405	6,871	199	3,191	179
OCEANIA	3,081	2	-	46	191	173	59	154	1,317	375
WORLD	439,375	43,124	559,795	390,59	607,369	33,149	704,822	40,297	796,600	50,043

Source: Bureau of Statistics, Annual Statistical Bulletin 1983.
Bureau of Statistics, Statistical Yearbook 1987.

that SADCC[3] markets are increasing in importance to Lesotho even though their utilization is far below potential use.

1.5 The Agricultural Economy

Agriculture in Lesotho is the key sector and a major source of employment in the domestic economy. Approximately 85 percent of the population live in rural areas and about 60 to 70 percent of the country's labour force obtain supplemental income from agriculture. Lesotho's agriculture is characterized by low and declining production such that its contribution to GDP declined from 50 percent in 1973/74 to 22 percent in 1983/84. The agricultural sector is increasingly being dominated by livestock. In 1966, when Lesotho gained independence, crop production contributed approximately 60 percent of the value of agricultural output with livestock contributing about 40 percent. By 1983/84 crop production contribution had declined to approximately 22 percent (Table 1.5).

1.5.1 Crops

The major crops grown in Lesotho are maize, sorghum, wheat, beans and peas. About 13 percent (40,000 ha) of the land is considered suitable for crop farming. Approximately 80 percent of this land is situated in the lowlands. The suitable land area for crop farming has been declining progressively due to soil erosion, overstocking

[3] SADCC is the Southern African Development Coordinating Conference which is the regional economic cooperation of the Southern African countries with the exception of RSA.

Table 1.5: Share of Crops and Livestock to Agricultural Output (Percent)

Year	Subsector Crops	Livestock
1966	60.0	40.0
1973/74	47.2	52.8
1974/75	10.2	59.8
1975/76	58.6	41.4
1976/77	59.0	41.0
1977/78	56.0	44.0
1978/79	-	-
1979/80	-	-
1980/81	42.7	57.3
1981/82	40.4	59.6
1982/83	30.6	69.4
1983/84	22.4	77.6

Source: Third and Fourth Five Year Development Plans 1981 and 1986.

and the encroachment of residential areas on arable land. Crop agriculture is characterized by a high proportion of subsistence farming, with over 70 percent of the production not marketed. The average land holding per household is 1.2 ha.

Lesotho's crop farming has experienced continuous declines since 1978/79. The overall index of food production (encompassing the five major crops: maize, sorghum, wheat, beans and peas) shows that from 1973/74 to 1984/85 production on average declined by about 5 percent per annum. The causes of the declining production include drought, low and decreasing yields, low fertilizer applications, low and erratic rainfall, hail, frost, and soil erosion. In addition, the level of mine wages in the RSA is recognized as a factor affecting agricultural production. Since suitable levels of subsistence can be reached by most households through mine remittances, there exists little incentive to engage seriously in agriculture.

The production of the major crops indicate a declining trend. Crop production reached peaks in the years 1976-1980 and has since been on the decline (Table 1.6). The decline of the 1980s was caused mainly by the drought which affected the whole of the Southern African region. Crop production picked up in 1984/85 when favourable weather conditions were experienced.

Table 1.6: Lesotho Crop Production ('000 mt)

Year	Maize	Sorghum	Wheat	Beans	Peas
1973/74	112.5	84.0	57.0	7.5	7.2
1974/75	70.3	37.4	45.3	13.38	5.79
1975/76	49.1	24.5	44.6	8.65	5.76
1976/77	125.9	62.3	61.4	21	7.03
1977/78	143.2	85.8	57.9	11	4.43
1978/79	124.9	69.0	33.6	8	6.86
1979/80	105.6	59.3	28.2	4	4.56
1981/82	105.7	47.7	17.0	4	3.20
1982/83	83.0	26.0	14.5	5	4.53
1983/84	79.4	54.8	18.4	2	3.28
1984/85	92.4	54.8	18.5	3.3	1.5
1985/86	86.5	33.6	11.0	4	1.50
1986/87	94.9	31.2	18.5	3.3	1.5

Source: Bureau of Statistics and Ministry of Agriculture, Agricultural Situation Report 1984 and 1987

The major factor in declining crop production is the poor yields realized in Lesotho as indicated in Table 1.7. Crop yields realized in Lesotho compare unfavourably with the yields realized in the RSA and Swaziland. The average yields in the RSA for maize, sorghum and wheat were 2,000 kgs/ha, 1,900 kgs/ha and 1,000 kgs/ha respectively for the period 1974/75 to 1983/84 while in Swaziland the average maize yields were 1,300 kgs/ha for the same period. For Lesotho average yields for the same period were 809 kgs/ha for maize, 817 kgs/ha for sorghum, and 817 kgs/ha for wheat. Therefore, yields in Lesotho were only 40.4 percent of RSA maize yields, 43 percent of RSA sorghum yields and 82 percent of RSA wheat yields.

1.5.2 Livestock

The Lesotho livestock subsector consists of cattle, sheep, goats, horses, donkeys, pigs and poultry. Livestock are kept for both economic and social gains. Cattle are raised mostly for subsistence use, including draught power, milk, fuel (dung), meat and socio-cultural uses such as bohali (bridewealth) and ceremonies. The sheep are of the merino type and are raised for the sale of their wool, for slaughter as well as for ceremonial purposes.

Table 1.7: Lesotho Crop Yields (kg/ha)

Year	Maize	Sorghum	Wheat	Beans	Peas
1973/74	869	991	694	352	610
1974/75	556	547	715	418	401
1975/76	425	443	748	246	438
1976/77	1359	1331	1397	1207	724
1977/78	1284	1383	1270	756	775
1978/79	1020	1274	886	699	1035
1979/80	892	919	920	438	687
1980/81	774	749	722	383	585
1981/82	608	446	534	294	429
1982/83	601	539	465	255	298
1983/84	573	540	511	115	410
1984/85	637	672	427	250	535
1985/86	611	585	423	203	259
1986/87	587	396	629	182	319

Source: Bureau of Statistics and Ministry of Agriculture, Agricultural Situation Report 1984 and 1987

The goats are of the Angora type and are raised for the sale of mohair. Horses and donkeys mostly serve transportation functions in the remote rugged interior of the country. Sales of livestock and livestock products also earn cash income for their owners. The largest single monetary contribution to cash income from livestock is that provided by sales of wool and mohair while sales of live animals generate the next largest source of cash income.

The major problem facing the Lesotho livestock subsector is range deterioration. Lesotho rangelands are deteriorating as a result of overstocking. It is estimated that the present stocking rates are 150 - 300 percent of the estimated carrying capacity. In addition to affecting the rangelands overstocking affects livestock productivity. The poor nutrition as a result of overgrazing gives rise to low reproductive rates, milk production, pulling power of draught animals and fleece weight.

The livestock subsector is dominated by small holders. The average number of cattle, sheep and goats per household is 2.5, 43 and 25 respectively. Despite the strong desire for livestock ownership, about half of the rural households do not own livestock.

A relatively small proportion (8 percent) of the households are estimated to own approximately half the country's livestock. In Lesotho, ownership needs to be distinguished from use or herding because of the widespread practice of mafisa. Mafisa is a system of livestock borrowing and lending which generally gives the holder of the animals rights to the flow products, milk and drought while the owner retains title to the inventory including progeny.

On the one hand the Lesotho cattle herd has been decreasing, reaching a low of 522,100 in 1984/85 (Table 1.8). On the other hand both sheep and goat numbers have generally been increasing and this is attributable to increasing wool and mohair prices.

Table 1.8: Lesotho Livestock Numbers ('000)

Year	Cattle	Sheep	Goats	Horses	Donkeys
1973/74	465.5	1556.9	961.9	-	-
1974/75	512.4	1577.4	886.4	-	-
1975/76	502.4	1519.7	834.6	1003.4	92.7
1976/77	485.5	1128.0	617.5	104.1	89.4
1977/78	526.18	942.8	582.5	104.3	86.1
1978/79	560.3	974.0	618.3	101.7	85.2
1979/80	593.9	1043.6	784.3	101.1	85.2
1980/81	589.98	1168.4	766.5	100.9	104.9
1981/82	562.4	1337.4	930.4	103.1	97.5
1982/83	537.5	1279.5	872.1	104.4	107.4
1983/84	529.2	1280.9	857.0	109.2	107.4
1984/85	522.1	1412.2	1028.6	100.9	109.0
1985/86	524.7	1391.6	978.0	-	-

Source: Bureau of Statistics, Statistical Yearbook 1987

1.5.3 Land Tenure

In Lesotho land belongs to the Basotho nation and the King holds the land in trust for the nation. The administration of land falls in the hands of chiefs on behalf of the King. The underlying concept of the land tenure system is that land is a national and social asset to be utilized for the benefit of the nation. The system entitles all households to have access to land for residential and agricultural (arable) purposes. Grazing land is communal and there are no limits to the number of animals owned and grazed. With the increasing population pressure, landlessness has been increasing. According the 1970 Census of Agriculture landless households accounted for 13 percent of the total population in 1970; this increased to 25 percent in 1986 (1986 Population Census).

In order to address the land tenure system in the country the Land Act (1979) was introduced. The Land Act (1979) introduces the leasehold system of land tenure. The major purpose of this act is to promote agricultural production through equitable distribution to households interested in increasing agricultural output. The act provides for the establishment of Special Agricultural Areas (SAAs) which are designated by government for agricultural development purposes with the consent of the majority of land occupants in those areas.

The traditional laws and practices relating to land use and tenure have prevailed to this day, despite the passage of the Land Act 1979 which has remained largely unimplemented.

1.5.4 Marketing and Credit

Prior to 1973/74 the marketing of crops, livestock and their products and the supply of agricultural inputs rested largely in the hands of private traders. In 1973 government established two parastatals, the Produce Marketing Corporation (PMC) and the Livestock Marketing Corporation (LMC). The PMC become the sole agency under which grains and pulses could be marketed while the LMC was involved in the marketing of live animals, wool and mohair. With the introduction of the parastatals the role played by private traders diminished and they were only allowed to be involved in the agricultural marketing system as agents of the parastatals.

The LMC ceased operations in 1978 and its operations were taken over by the Livestock Products Marketing Services (LPMS) which continues to operate at present. The LPMS is involved in the marketing of livestock, wool and mohair. The LPMS does not purchase wool and mohair but acts as an agent for farmers belonging to Wool and Mohair Growers Associations (WGAs) in dealings with the RSA marketing boards through which Lesotho wool and mohair are sold. The PMC was dissolved in 1980 and its operations taken over by Co-op Lesotho. Co-op Lesotho was originally the Basutoland Co-operative Banking Union (BCBU) which was established in 1957. From 1974 to 1980, Co-op Lesotho acted as an agent of the PMC.

The present formal agricultural marketing system is dominated by Co-op Lesotho and the LPMS. Private traders are involved only in the marketing of wool and mohair. Co-op Lesotho is the designated marketing agency for crops and agricultural inputs. The other major players in the crop marketing system are the mills. Maize is milled at the Lesotho Maize Mills (parastatals), Maseru Roller Mills and Lesotho Milling Company while wheat is milled at the government mill, the Lesotho Flour Mills. The formal livestock marketing system is dominated by the LPMS which operates under the Ministry of Agriculture. The LPMS organizes livestock auction sales at a number of points around the country. In most cases the dominant buyer at these auction sales is the (National Abattoir and Feedlot Company) NAFC. The National Feedlot began operating in 1983 and its capacity is 3,600 cattle at any time. The plan is to feed cattle for 90 days which means it can accommodate 14,400 cattle per year. The feedlot has

recently started accommodating a limited number of sheep and goats. The National Abattoir began operations in late 1985. The design capacity of the abattoir is 100 cattle and 200 sheep or goats per day on a single shift. The abattoir operates on a custom and proprietary slaughter basis. The formal egg marketing system is dominated by Egg Circles which are run as co-operatives. The Egg Circles provide marketing outlets for commercial egg producers who are required by law to market through them. The Lesotho agricultural pricing policies are designed to encourage parity pricing with the RSA for agricultural commodities sold in formal markets. This is mainly done in order to deter illegal trade across the borders.

The supply of agricultural credit was until 1979 in the hands of private traders, commercial banks, co-operatives and area-based development projects. At present the major source of agricultural credit is the Lesotho Agricultural Development Bank (LADB) which is a parastatal. The LADB was established by legislation in 1976 and began operations in 1979. The share of agricultural credit in the total credit disbursed has been increasing. In 1982, the share of agricultural credit in the total credit was 0.7 percent as compared to 7.7 percent in 1986.

1.5.5 The Role of Government and Foreign Aid

Planning and implementation of activities in the agricultural sector are determined by several government organizations. These organizations are the Ministry of Agriculture, Marketing and Co-operatives (MOA), the Ministry of Planning, Employment and Economic Affairs (MPEEA), the Office of the Military Council and the Ministry of Interior, Chieftainship Affairs and Rural Development (MICRD). Of these ministries, MOA has the largest direct role in implementing the agricultural development of the country while the Office of the Military Council has the overall authority for making decisions on policy matters. The MICRD is responsible for implementing land tenure legislation and rural development projects. The MPEEA responsibility includes macroeconomic and sector investment planning, coordination of foreign aid and capital budgeting.

Foreign aid is a crucial and substantial element in the financing of development projects in the country. The practice is that projects are usually initiated by donors rather than by the government or the people of Lesotho. This has resulted in foreign aid agencies exerting too much influence on the development strategies of the country. Foreign aid is used mainly for the capital budget while the recurrent budget is 100 percent domestically financed. On average, the annual contribution of foreign aid to the capital budget is about 60 - 70 percent. A major portion of foreign aid goes to the agricultural sector. For example, in 1987, 24 percent of the foreign aid went to the agricultural sector.

1.5.6 Agro - Industries

The major agro-industries in operation in Lesotho are the three maize mills, a wheat mill, a livestock feed mill, the National Abattoir and Feedlot Complex, the Basotho Fruit and Vegetable Canners (BFVC) and Maluti Maid dairy plant. The three maize mills produce approximately 100,000 tonnes of maize and products annually while the wheat mill produces just over 30,000 tonnes annually. The BFVC cans asparagus which is exported to Western Europe. It also cans white haricot beans, peaches and French style green beans. The dairy plant has just been expanded to processes 10,000 litres of milk per day. A small proportion of the wool and mohair clip is used by the Lesotho Handspun Mohair and the weaving and tapestry enterprises. There are plans for the establishment of a wool and mohair scouring plant and a blanket manufacturing plant.

1.5.7 Agricultural Trade

Lesotho's foreign trade is characterized by foodstuffs and manufactured goods imports and the export of primary products. The total import bill consists of commercial and donated imports. The major agricultural imports are live animals, grains, fruits and vegetables. Donated imports usually include maize meal, wheat flour, milk powder and vegetable oil. A major portion of donated food is for school feeding, food-for-work projects and post-natal clinics. The USA, EEC and the United Nations agencies are the major sources of donated imports.

The major agricultural exports from Lesotho are wool and mohair. On average, the exports of wool and mohair account for over 70 percent of total agricultural exports. Agricultural exports usually contribute approximately 50 - 60 percent of total exports but this is on the decrease as exports of clothing and footwear are increasing.

2

MARKETING AND MARKETING RESEARCH IN DEVELOPING ECONOMIES

Gary G. Storey

2.1 Introduction

As outlined in the Introduction the Agricultural Marketing Project was to study the agricultural marketing system in Lesotho. More specifically it was to evaluate the performance of various components of the marketing system. Various commodities or sectors were selected for detailed study. These are contained in the following chapters.

An additional purpose was to examine the role and importance of marketing and markets in the process of economic development. This was particularly important given Lesotho's stage of economic development and its unique economic relationship(s) with the Republic of South Africa as outlined in Chapter 1.

2.2 Marketing in Development Transition

At the lowest level of economic development the highest percentage of a country's population is engaged in the production of basic needs. Households are seen as being primarily self sufficient. At the earliest stages of economic development simple specialization would tend to occur and surpluses of certain goods would result beyond the basic needs of the household. These goods would be traded (bartered) with other households. Exchange would therefore be direct between households. The rate at which the exchange would take place, or the price, would be a matter of negotiation.

Such societies are thus predominantly rural. The small urban population that exists creates a demand for food which it does not produce for itself. This creates the basis for further specialization and surplus production. It also establishes the beginnings of the agricultural market economy.

Agricultural marketing includes all the activities that are involved in transporting, storing, and processing and arranging the movement of agricultural commodities to the urban domestic consumer and foreign buyers. In the earliest stages this would consist of transportation with limited storage and processing.

At the other extreme from the subsistence economy is the highly developed economy where only a small percentage of the population or labour force is directly engaged in agricultural production. Under this situation populations are predominantly urban and must depend on a sophisticated agricultural marketing system to meet their specific food needs.

Norvell and Branson provide a useful schematic that illustrates the various stages that agricultural marketing systems undergo as a society transforms itself from being predominantly rural to being predominantly urban.

In developing economies with largely rural populations, agriculture is likely to consist of both subsistence and commercial farming. This dualist structure has important ramifications for the marketing system that develops. As suggested by Elz, "At the subsistence level marketing is not essential for the agricultural sector to survive. This is in contrast to other sectors of the economy for which marketing is indispensable for existence and development".

For the commercial sector, profits are likely the main objective of the farm firm. As a result the firm is concerned with increasing productivity relative to costs. The firm is open to, and would seek, new technology. The farm is likely to specialize in a few selected products that afford economies of size or scale, and inputs are critical to the profitability of the farm. This implies the need for an efficient marketing system for both the farm's products and required inputs.

The subsistence farm in contrast would produce a wide range of products to satisfy the needs of the household. Its initial objective function would be the survival of the household and family. Under these circumstances the household has little capacity to take risks by experimenting with new products or technologies. It would be conditioned to remain with traditional methods of farming. In that these traditional methods required basic technologies, and without a surplus to provide cash, the farm has no need or at best a limited need for an input market. It would be the classic mixed farm. As it moves away from basic subsistence and attempts to raise the standard of living of the household, it would specialize in one or more crops and/or livestock to generate a surplus from which it would generate a cash flow.

As a result subsistence farms would seem to be isolated. They generate little demand for an efficient marketing system, in comparison to commercial farms.

For purposes of economic development a country must develop the agricultural policy that will transform agriculture from subsistence to commercial farming. Modern industrial states require an efficient marketing system. Marketing is seen to play a crucial role in economic development. Much of the literature focuses on "market failure" as one of the root causes for failures of economic development. However, before turning to the specific issue of market failure it is important to examine what the received development literature has said about marketing and development, and the transition of societies from primarily agricultural to industrial.

2.2.1 The Issue of Market Failure in Development

The development literature is replete with different perspectives on the importance of markets to development, and marketing. Some development economists

have treated the role of middlemen in the marketing process as unnecessary, thus claiming that middlemen rob producers and consumers of their just returns. Consequently the role of the private sector in marketing is held with suspicion, and the role for government in marketing is established. That is, economic development requires government direction and control of the economy because markets do not work. This has been the position taken by the structuralist approach to development.

Arndt suggests that little attention has been paid to the precise meaning of the concept of "market failure" even thought the development literature has been preoccupied with it. He asks, "...in just what respect do markets fail and ... which sources of market failure are particularly prevalent in underdeveloped economies and constitute a prima-facie case for government action in such economies?" (Arndt, p.219).

As discussed previously differences in productivity is one of the key factors that distinguishes a subsistence farm from a commercial farm. In general it is differences in productivity that distinguish developed from underdeveloped economies.

Theorists have struggled to explain how the transition occurs from low to high productivity and thus underdeveloped to developed.

Standard neoclassical theory has tended to focus on the allocative functions of markets. Neoclassical theory has also tended to be static and to examine adjustment as a process of comparative statics. Arndt in his analysis of market failure borrows Kaldor's (1972) distinction between the "allocative" and "creative" functions of markets. He treats the allocative function as moving the economy along the optimum point of a production possibility curve, whereas the creative function of markets is to shift the production possibility curve outward.

The issue of the creative function of markets is to ask to what extent are markets responsible for transmitting information and impulses for increasing productivity, hence economic growth? To what extent can markets facilitate economic change, thus establishing the mechanisms for not only economic but social and political change as well? Specifically, can markets transmit "impulses" that affect various household propensities that are associated with savings and investment, and with innovation?[1] It is important to establish that innovation is nothing more than the creation of new ideas[2] developed and adopted. But to determine how new ideas are developed and/or adopted by societies is the crucial question. Further at issue is how to develop the right social, political and economic climate in order to foster economic expansion.

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[1] Later we deal specifically with the role of the entrepreneurial function and the role the markets play in this process.

[2] The extent to which different cultures in different periods of history foster new ideas and establish successful civilizations is of great importance but beyond the capacity of this chapter. For a discussion of this issue, see Baumol.

The allocative function of markets assumes implicitly that economic agents respond to price (market) signals, that resources exist, and that it is primarily a question of the efficiency to which firms and households adjust to new signals. In other words it is the economics of equilibrium at work. Further, it is the process of comparative static adjustment.

Arndt discusses failures in components of the price mechanism, signalling, response and mobility. Market failure in its response function refers to failures to respond rationally to economic incentives. The failure rests with the assumption that households are assumed to respond to economic incentives, and where they do not, it is assumed to be a failure of the price mechanism. The failure of present households to adopt new technology and to risk innovation is taken as a breakdown in the response mechanism to the creative function of markets.

Where there are obstacles to factor mobility, such as high transport costs, lack of information, both allocative and creative functions of markets are affected.

Markets that fail to provide clear signals for investment, in the face of high savings, and employment in the face of unemployment, fail to achieve investment and full employment. Markets fail to create increased productivity, hence a shift out of the production possibility curve.

Markets are thus seen as instruments for economic efficiency in the allocative functions and economic growth in their creative functions. The distinction, however, is not clear cut. Prices naturally guide where best to allocate resources in the short run, but also in terms of innovation and investment in new technology. Not all investment decisions are allocated since the rate of investment decision is one of allocation between the present and future. But to the extent that markets provide the signals and elicit the responses of innovators to exploit new profit opportunities through the creation of new technologies, production of new products and selling into new markets, markets can be seen to be creative.

Liebenstein in applying his concept of X-efficiency to the problems of economic development, provides an explanation of how non-market elements impede productivity. It is an explanation of why some firms even with access to inputs fail to achieve optimal output. The degree of X-efficiency of the firm is seen as depending upon the effectiveness of its management in utilizing inputs fully and technology efficiently.

In the development context Liebenstein sees a failure of the economy to effectively organize or manage its resources and to adopt technology that is available. The entrepreneurial role here is crucial and it is often lacking.

What is even more relevant for underdevelopment is the failure of markets to exist, or to develop. That is, markets may not come into existence to link producers and consumers. Transaction costs may be so high that markets fail to develop, or to

disappear.

According to Arrow, markets may fail to come into existence because of the inability to exclude free riders; information costs may be too high and there is lack of a market to deal with uncertainty, i.e. lack of a futures market.

As Arndt explains, Myint posed the problem in the context of dualism, the coexistence of modern and traditional sector within the same economic system. In broad terms Myint refers to this as organizational dualism. He explains that the underdeveloped economy is characterized by a weak organizational framework. He sees the households of the traditional sector not fully entering the market, not because of irrationality but because transport costs, information costs and transaction costs are too high. The resulting price differentials that exist in goods, input and labour markets are sufficiently great to impair allocative efficiency. This is particularly relevant to the case of Lesotho as explained in Section 2. Thus there is a close similarity of Myint's organizational framework limitations and Arrow's non-existent markets. If transport costs make the sale of produce uneconomic, if transaction costs limit bargaining, and if technology is not known (information costs), this can be interpreted as market failure in the sense of creative (or dynamic) efficiency.

What is needed is innovation to improve the organizational structure and thus to reduce transactions costs in all forms. What this amounts to in Myint's view is the lack of appropriate economic institutions, especially improved transport, communications, education, and other infrastructure. The importance of reducing transactions costs is that it increases the supply of economic opportunities. What is important is to be able to increase productivity through the creation of effective and efficient markets.

In summary, the role of the economist in studying marketing in situations of underdevelopment is the need to understand the creative dimensions of marketing, that is, the need to determine how markets and the marketing process can assist and to a degree facilitate the transformation of the economy and society. Further, this perspective implies that the process of economic development is difficult and complex. In other words, it is not possible to understand the transformation process without first understanding the broader complexities of social, cultural and political systems. There is thus in the dynamic sense the need to know the history of the particular society. In the same vein is the need to understand institutions, that is, the particular behaviourism. This is primarily what distinguishes neoclassical economists from institutional economics. It is why many economists, i.e. the early Institutionalists, rejected neoclassical economics and its focus on marginal analysis and comparative statics. They rejected neoclassical economies since it was not good at explaining change, disequilibrium and hence economic dynamics.

2.2.2 The New Institutional Economies, Marketing and Development

The purpose of this section is briefly to discuss the importance of institutions and the perspective of institutional economies for the understanding of (1) the development of markets and marketing, (2) the performance of markets, and (3) the role of marketing in development.

It is useful first to define what is meant by institutions and thus institutional economies. There are at least two perspectives. The behavioral perspective states that "institutions are complexes of norms of behaviour that persist over time, by serving collectively valued purposes" (Uphoff, p.9). The rules perspective states that "institutions are the rules of a society of organizations that facilitate coordination among people by helping them from expectations which each person can reasonably hold in dealing with others" (Rattan and Hayami, p.204). The tendency in neoclassical economies is to take behaviour as simplistic and given. In institutional economies more emphasis is placed on understanding the nature of behaviour and societal rules and how these affect economic decisions. The perspective allows for a better understanding of "economic man".[3] Further is the acceptance that institutions are not static, that over time the rules that characterize institutions can evolve given different sets of stimuli experiences, and needs. That is, different behaviours will give rise to new sets of rules and vice versa.

Nabli and Nugent outline that in most definitions of institutions there are several explicitly stated characteristics basic to the concept of a social institution. The first characteristic is the rules and constraints nature of institutions. They quote Ostrum, in defining these rules and constraints as "prescriptions commonly known and used by a set of participants to order repetitive, interdependent relationships. Prescriptions refer to which actions are required, prohibited or permitted".

"The second characteristic of institutions is their ability to govern the relations among individuals and groups" (Nabli and Nugent, p.1335). The question of whether they are voluntary or are enforced through some external authority is important to marketing and trade."

Both of the characteristics are particularly important to understanding the performance of markets and marketing. It is important to the ability to contract, to enter into agreements that will be honoured without recourse to the costly process of dispute settlements in the courts, etc. It raises the question of honesty, in keeping one's bargain, which is crucial for the continuity of markets.

"The third characteristic of institutions is their predictability" (Nabli and Nugent,

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[3] It could be argued that if more economic advisors from developed countries took time to study local institutions they would be less surprised at the failures of their recommendations.

p.1335). This suggests that rules must be understood to be applicable to future situations, that they are stable. They state further ". . . markets, be they stock exchanges, labour markets, credit markets, wholesale markets, or traditional bazaars, are institutions because they embody rules and regulations, formal or informal, which govern their operation" (Nabli and Nugent, p.1335).

What is important is the ability of societies to undertake the collective action necessary to establish the rules and regulations that make the establishment of markets possible in the first place. Also important is their effectiveness and efficiency.

In that various rules govern the ability to contract, they too are institutions. Here too, since the ability to contract efficiently is an important if not indispensable dimension of markets societies that do not have the cultural characteristics that make contracting possible will have difficulty in establishing effective markets. For example, much of the international business in grains is carried out through verbal agreements. The honouring of these agreements without the additional costs of financial contract, legal costs, and appeals to court (or tribunal) procedures in the face of contract failure, lends efficiency to these types of markets. This suggests that honesty and trust are characteristics that are important in the functioning of many markets. As is explored later, in performance characteristics, these attributes are important in vertical market systems (see also, Chapter 3).

What is suggested here is that various cultural codes of conduct and rules of behaviour are institutions in that they affect and constrain the relationships between individuals and groups in society. It is not possible to provide a full treatment of the subject of institutional economies. However, the work of the new institutionalists is felt to be of critical importance to an understanding not only of market performance, but also the ability to establish markets and marketing functions that are indispensable to the process of economic development. In particular is the work of Coase, Stigler, Peltzman, Williamson, Ruttan and Hyami, de Janvry, and Olson to name the more obvious. It is the theoretical work on transaction costs, collective action, regulation, information and communication, and rent seeking that is of particular importance.

2.2.3 Education and Institutional Change

Before leaving the subject of institutions, one further issue needs to be addressed and that is the question of institutional dynamics. Institutional economists have been critical of neoclassical economies for its simplistic treatment of behaviour postulates. They have been critical of the neoclassicists for not explaining the dynamics of economic change. The institutionalists assume that behaviour and rules of conduct do change and that these can give rise to different means of organization and productivity. But what causes societies to change the rules and codes of conduct, hence behaviour, under which they operate?

We put forward the proposition that education can play a vital role. We

hypothesize that it is not so much the quantity of education, taken to be the level of literacy that a country achieves, but the quality of the education. Here the quality of the education is taken as the means by which education can break down existing individual and family attitudes and instill new attitudes that are important for economic development. In particular we are thinking about what is required to establish an entrepreneurial class in society.

Research on education provides evidence that economic growth and education are closely linked. But as stated above, there are two aspects to education, quantity and quality. It may not be enough that the level of literacy is raised if at the same time new attitudes are not established that will lead to new means of behaviour toward economic activities, work, saving and investment, etc. To what extent can education provide (create) a sense of motivation and establish a sense of achievement orientation? More specifically, can education change attitudes that mitigate against the propensities of individuals that are important for economic development? The protestant ethic has often been held as a sociological factor in spurring the industrial revolution. In simple terms, the theory was that there were rewards for hard work and achievement. The selfish ethic that underlies the notion of economic man - which is taken to be the motivational force for profit, hence the driving force of the capitalistic firm - is not necessarily the main institutional propensity in all societies. To the extent that it is absent in traditional societies, will raising of the literacy level provide the basis for this institutional change?

Much depends on the attitude of the society toward knowledge (i.e. education) and how it is to be used. The question is the difference between learning things versus learning how to achieve, and further providing the motivation to want to learn new things, and to be productive. In other words the question is how to provide an achievement orientation.

To what extent are households open to an achievement orientation? What attitudes do parents have for the knowledge of their children, the curiosity of their children? In many hierarchial societies, it is accepted that knowledge and authority are held by elders within the family, and by chiefs within a communal structure. Children within the family are expected to show respect for elders, in this sense by not asking questions, and by not challenging authority. The same may apply to communal hierarchies. It follows that this behavioral propensity could block the ability of households and communities to establish new attitudes toward progress, block the acceptance of new technological and new collective action.

What does this suggest specifically for marketing and markets? It has several implications.

First, it suggests that it may be difficult if not impossible for traditional societies to establish new means of collective action which are necessary for establishing marketing functions. For example, it may mitigate against the

formation of cooperatives and producer marketing boards. It may explain why the success of cooperatives in various parts of Europe and North American were successful means of farmers establishing new means for organization, cooperatives have largely played a much less important role in Africa. Whereas cooperatives were formed from within the social structure (consumers, or producers), cooperatives have been largely formed by government in Africa. To the extent that cooperatives are an important means for organizing marketing services, such as the organization of the physical function where size (scale) are important (transportation, storage and processing), the formation of these market services are blocked.

Second, is the inability of farmers to organize politically for purposes of rent selling.

Third, as was suggested earlier, is the importance of education in establishing the basis for creating an entrepreneurial class in society. It is the premise that education matters, that an entrepreneurial function of risk taking and innovation is not a genetic but an acquired trait. It is the further premise that the quality of education, more specifically the methods by which science is taught in schools and the approach taken in instilling a sense of the possible, that creates attitudes of achievement orientation.

The issue of educational quantity and quality is addressed by Psacharopoulos and Woodhall in a 1985 World Bank report. They first distinguish between internal and external efficiency of education. External efficiency is taken to mean how well schools prepare students for their roles in society as indicated by employment prospects and earnings. These measures depend more on external factors. Internal efficiency is concerned, they state, "with the relationship between inputs and outputs within the education system or within individual institutions. Output in this case is measured in relation to internal institutional goals rather than the wider objectives of society". They point out, however, that it is possible for societal and school goals to be in conflict. Based on statements of aims and objectives that provide measures of output reflecting the objectives, they mention amongst others "noncognitive tests designed to measure pupils' attitudes and motivation (for example, their attitudes toward modernity" (p.206). In understanding and measuring educational output they mention that such factors as family background or motivation influence educational achievement, and that this may be sufficiently dominant to swamp the effect of school inputs. Output here is taken to mean the achievement of students in terms of knowledge, skill's behaviour and attitudes -- "that is, the ability of people to be socially and economically productive" (p.207). What is particularly important is not the effect education has for raising earnings and employment, since these may be inappropriate measures when what is really important is the effect that education has for the long-term economic and social effects for the country in question. Here we refer to the effect education has for entrepreneurial activity.

A recent world Bank study on Education in Sub-Saharan Africa provides further evidence of the importance of education to economic development. In examining labour productivity they report; "A recent review of eighteen studies of farmers' education and farmer productivity in thirteen countries concluded that farmers who have completed four years of education produce, on average, about 8 percent more farm output than farmers who have not gone to school..." (p.22).

It was pointed out that the effects of education were more important in modernizing environments where there was availability of more crop varieties and reasonable incentives versus situations in more traditional environments where these factors were lacking. This suggests the importance of the existence of markets that can provide incentives for investment to increase agricultural productivity. That is, education alone is not enough; but similarly marketing infrastructure without education may not be enough.

The report further points out that the education of parents, especially the mothers, is shown to affect the cognitive development of children. The benefit is felt to result from the effect of education on family income and through the effects on parents knowledge and good nutrition habits.

The report suggests that exactly how education determines economic growth may not be fully understood. They question the relationship found between the rates of return in earnings of the better educated, suggesting that indirectly the earnings of the less educated may be suppressed. They suggest conversely ". . . that the better educated enhance the productivity of those around them (through their entrepreneurial activities or technical contributions, for example), measurement of income differentials by education level may understate education's impact" (p.25).

The report addresses the very question that is of importance to the issue of changing institutions. In terms of quality the report states that the major measurement is cognitive achievement. It is important because enhancing cognitive achievement contributes to a student's ultimate productivity. In addition, "Quality pertains also to how well the school prepares students to become responsible citizens and instills attitudes and values relevant to modern society" (p.32).

The report explains that the challenge is particularly great for many African children since their life at home is quite foreign to that faced at school. "Quality thus encompasses how well the education system does the job of accommodating modern, market-oriented skills to traditional home-based values and needs" (p.32).

It is stressed that policies to achieve the qualitative objectives must take account of the child's economic role in the household, use of proper language, and integrate the subjects around the life of the child and his community, and ". . . involving students in the application of theory so that learning has utility beyond that of qualifying individuals for the next level of education" (p.32).

2.3 Evaluation of Market Performance

In the previous section, various issues were discussed about the importance and role of marketing and markets to economic development. The position taken was that markets, and the functions of marketing can only be understood in a broader social, cultural and political setting as well as that of economics. This is, the question of the development of appropriate markets and marketing systems can only be understood in a broader framework than implied by economics alone.

For the economist, working in a developing country, the approach taken to market analysis and prescription must be different than that normally followed in a situation of a well developed functioning industrial society. The main difference is in what is understood and assumed about individual and group behaviour, hence institutions.

The purpose of this section is to review and present the standard approach normally taken to market performance evaluation and to suggest areas for change that would incorporate what we will refer to as the "new" reality or perspective. No attempt is made to provide a complete treatment of the literature, but to outline the more typical such as the standard structure/conduct/performance paradigm and approaches offered by several others (Martin and Holtzman).

Meissner (1982) offers a criticism of Western and developed economy oriented advisors in recommending the transfer of capital-intensive mass marketing technology as a solution to problems in developing countries for the distribution of consumer staples. He attacked Galbraith for this type of recommendation, but exonerated him when Galbraith, writing in The Nature of Mass Poverty, recognized this fallacy.

2.3.1 The Structure/Conduct/Performance Paradigm

The origins of the industrial organization approach to market analysis can be attributed to Joseph Bain, writing in the 1930s.

The basic premise of the analysis, or causality, is that market structural characteristics are assumed to determine (or influence) the way in which economic decision makers (firms) behave (conduct), which in turn determines various levels of performance. The causal linkage is as follows;

Structure → conduct → performance
(behaviour)

Bain felt that the relationship could be drawn directly between structure and performance. What is left to the analyst was to determine the important dimensions of each of the causal variables, structure conduct and performance.

Scherer has provided an expanded description of the paradigm as outlined in Figure 2.1. What has been added is that is now assumed that certain basic conditions can influence, or in fact determine structural characteristics. While these are usually taken by the economist as analyst, it does provide the perspective that other non-economic characteristics could be important. This model of the paradigm thus affords the potential for a broader approach to understanding the factors and conditions that affect the structure of the economy, and markets. For example, it would allow the institutional economist to examine how various cultural and social behaviours affect structure and performance directly, either as basic conditions, or as firm (market) behaviour itself.

More importantly, as Scherer has introduced the possibility of feedback effects of performance on both structure and behaviour, and behaviour on structure, it suggests the need to look at the paradigm in a dynamic rather than a more narrow static sense. It suggests further that the analyst must attempt to hypothesize, if not understand, how the economic system unfolds over time. It pertains to what was suggested earlier about the need to understand the sectoral transition of development.

2.3.2 The Vertical Systems Approach

The vertical systems approach to the understanding of marketing can be traced to the definitions of marketing that tend to state that marketing includes all those business activities that are involved in the flow of goods (and services) from the point of initial agriculture production to the ultimate consumer (Kohls). In essence it reflects what Breimeyer referred to as the "what happens school of marketing".

The various models of marketing systems at different stages of economic development, as developed by Branson and Norvell, have already been introduced (see Section 2.1).

In terms of vertical systems this perspective of marketing focuses attention on the coordinating role that marketing and markets, must perform. As was discussed earlier it specifically requires that markets perform roles in providing various signals for production and marketing. Further, the approach requires an analysis of how well markets perform these specific signalling roles. Where markets exist between producer (seller) and processor (buyer), price is assumed to be performing the role of signalling, what is to be produced, what quantity, what quality, when it is to be delivered. Similarly for other nodes in the vertical market system.

The degree to which the market place fails to correctly provide the signals which leads to various forms of marketing inefficiency, are indications of market failure. The analyst would thus conclude that the coordinating role is not correctly being performed.

To remedy the problems where market failure exists, firms have resorted to various forms of avoiding the market place. This is done through (1) forms of

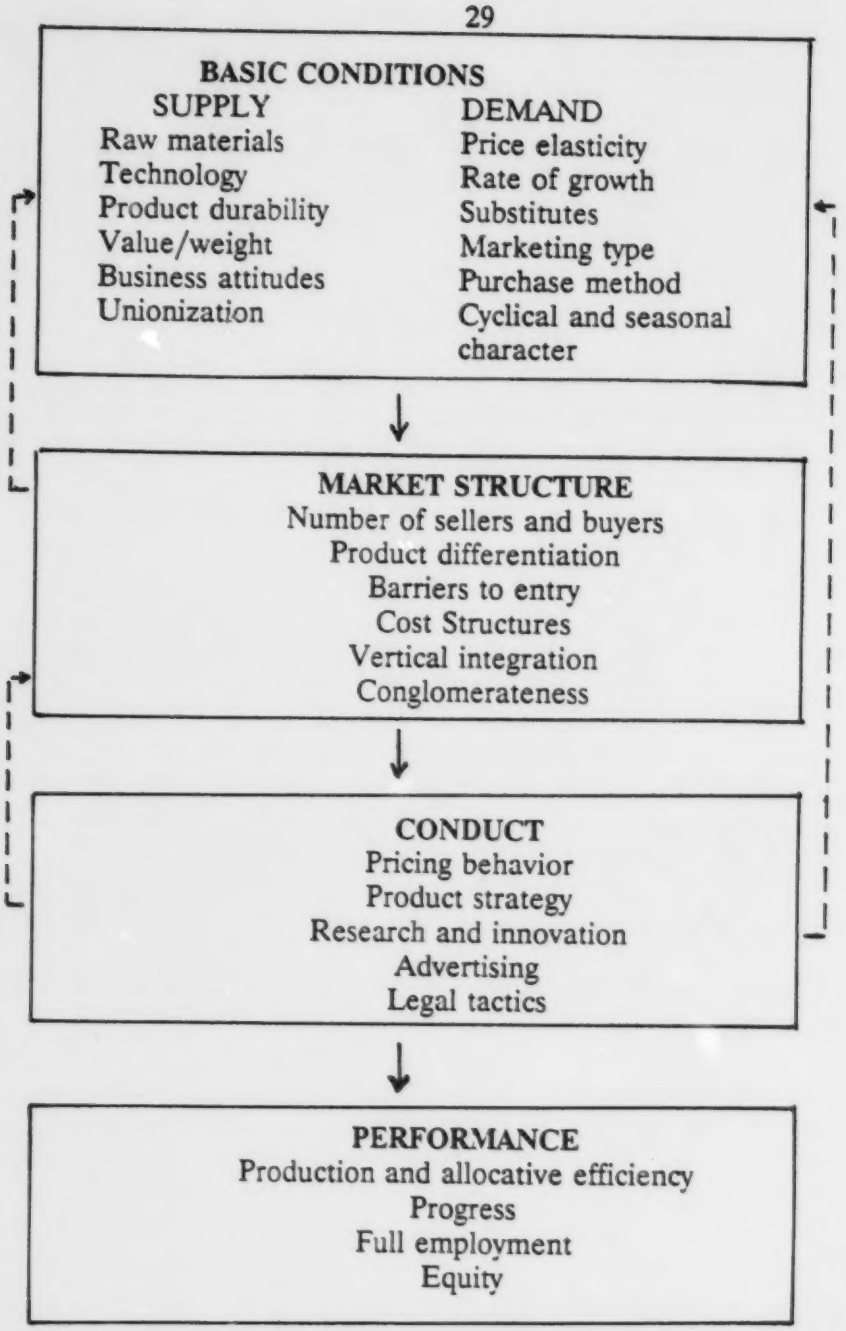

Figure 2.1: Model of Industrial Organization Analysis

Source: Scherer, F.M. Industrial Market Structure and Economic Performance.

contracting, and (2) market integration (see Triffon, Baligh and Richartz).

In carrying out research on vertical market systems, the market analyst is required to study how market coordination is carried out at different levels of the marketing system. The procedure is usually to develop an understanding of the relationships between buyer and seller.

One approach is that of Parcell (1979) who developed "the mirror image" questioning approach (see Chapter 4, p.78, for a more detailed outline of the approach). Non parametric procedures are used to test the degree to which buyers and sellers correlate in terms of important characteristics. The degree of correlation is taken as a measure of market coordination.

Similar to the position taken for the S-C-P paradigm, it is suggested here that research results using this approach will be dependent on how well the analyst understands the institutional setting in which buyers and sellers interact. This is particularly important for the economist working on short-term consultancies in developing countries where they are unlikely to understand the various institutions that will affect business relationships between buyers and sellers. It also applies to economists from the particular country who may not be trained to take non-economic (institutional) factors into consideration in establishing their research framework and hypotheses. It means that economists must study the correct literature that will provide a more complete understanding of institutional factors; in particular sociological anthropological and possible psychological studies.

2.3.3 Goal Structure Approach to Market Performance

Several economists have offered what can be referred to as the goal structural approach to evaluating market performance (Elz, Martin).

The approach followed begins with the recognition of the functional school approach to marketing, that is, that markets and marketing have various functions to perform in efficiently guiding raw products from primary producer to consumer. It is further recognized, and this is the important departure from the narrower functional approach, that "the marketing functions are closely interwoven into the whole national economy and materially contribute to the economic and social development of the country. The extent of this contribution depends greatly on the stage of development of the national economy in general and on its agricultural sector in particular" (Elz,p.5).

In studying the various groups that make up the marketing (and production) system the approach begins with the need to understand the aims (goals) of each interest group in the marketing system. Although not formally stated by Martin and Elz, this approach can be taken as a departure from the more narrow market structural approach of neo classical economies best reflected in the S-C-P paradigm of Bain. The goal-oriented approach thus supports the contention that an understanding of behaviour

and social codes of conduct are important to understanding how households (as producers and consumers) and business firms will react to various stimuli and carry out marketing functions.

Elz has offered specific marketing goals of individual interest groups (see Table 2.1).

As the table shows, the goals of the individual groups do not necessarily coincide. As the reader will quickly realize, it is this situation that gives rise to the coordination problems often found in vertical systems analyses. For this reason a combination of the two approaches can be seen as useful.

It is when the analyst begins to look at second level goals of each market interest group, that further marketing problems are revealed. Elz offers a goal structure system for agricultural marketing (see Table 2.2). It is a hierarchy of goals. It is introduced here as an illustration of the use of the technique.

Martin offers a goal hierarchial approach to market performance analysis that differs from Elz in one important dimension - he focuses on the need to develop effective performance measures (norms). Martin, like Elz, first outlines broad/general industry level goals. From these goals are derived specific objectives that direct the market analyst to develop a set of measures. The problem, especially for application to developing economies, is to establish measures for which data exists. An examination of Martin's example (see Table 2.3) reveals that many of these performance measures are based on the analysis of historical data series. They also depend on having accurate data. For many developing countries the poverty of good historical data would limit the use of many of these measures.

We suggest that the goal structure approach lends itself well to the argument being made that institutions matter. The market analyst in adopting this approach to market performance analysis, is required to carefully understand the specific goals of each interest group. From the institutionalist perspective this implies a careful study of the social and cultural characteristics of producers, traders, business firms and government agencies that make up the marketing system.

It can be further suggested that where the goals and objectives of each individual group are identified, it would reveal various degrees of agreement and conflict. This is partially recognized in Elz, but not specifically in Martin. It thus implies the need to combine the perspective of the vertical systems approach with that of the goal-oriented approach for effective performance evaluation.

2.4 Implications of Small Country/Large Country Model of Marketing and Trade

The structure and major characteristics of the economy of Lesotho and its

Table 2.1: Specific Marketing Goals of the Individual Interest Groups

Interest Groups	Goals
Producers	Secure subsistence production Developed and guaranteed markets Improved market position Increased and stabilized prices for output Stable supply and prices of inputs
Traders	Time- and cost-efficient purchasing No trade restrictions Reduced risk High volume and profit
Trade supporters	Smoothly functioning market systems General support of market exchange function (such as infrastructure and communication)
Trade planners and decisionmakers	Reinforced social or political ideas Market interventions to stabilize prices Secure food supply Promotion of export sector

Note: Consumers form another group.

Source: Elz, Dieter. Agricultural Marketing Policies and Development.

relationship to the RSA, were described in Chapter 1. The emphasis was on the agricultural sector. In the chapters that follow, several sectors of the agricultural economy of Lesotho are analyzed. The focus is on the marketing systems; however, in the case of dairy (Chapter 5), the emphasis is on an examination of alternative policies, and for the analysis of the range/livestock system (Chapter 3) the treatment is much broader.

In all cases it is important that the theoretical underpinnings of the relationship of the Lesotho economy with that of the RSA are understood. The purpose of this section is to present a model that illustrates the efficiency and distributional (welfare) implications of the comparative structures of the two related economies.

Table 2.2: Examples of Goal Structure Systems for Agricultural Marketing

A. General goal	National independence		
Main goal	Economic self-sufficiency with minimum dependence on external influences		
Sector goals	Increased self-sufficiency	Diversification of production	
Corresponding market development goals	Increase market productivity through - higher or more stable domestic produce prices - efficient input marketing - competition through ensuring market entry Strengthen demand for domestic agricultural products through - security of supply - orientation of production to meet consumer preferences - improved interregional market communication and, therefore, relative prices of goods	Reduce production and market risks through - introducing new and complementary production technology - diversifying into specialized crops and livestock products - creating markets for new products	
B. General goal	Welfare		
Main goal	Increase real social product		
Sector goal	Develop productive resources of technology	Develop productive resources of labor	Develop productive resources of capital
Corresponding market	Introduce new technology Support innovative trade groups Provide investment incentives (credit,etc.)	Improve the quality of labor Develop programs for traders Develop market advisory programs	Support capital formation and efficiency, particularly in trader's community Increase demand for industrial farm inputs Transfer productive resources based on comparative advantage
C. General goal	Social Justice		
Main goal	Eliminate unequal income development and distribution		
Sector goal	Stable agric. prices	Directing agricultural marketing	High employment
Corresponding market development goals	Increase market transparency Standardize products Develop storage Develop infrastructure Reduce marketing costs	Improve economics of the distribution system Implement quality control and training Provide government market regulation through price support, supply, adjustment, and credit Support producer marketing groups	Establish labor-intensive processing industries Support artisan and small-scale industries based on intermediate technology

Source: Elz, Dieter.

Table 2.3: Performance Objectives, Indicators and Quantifiable Measures

Objective	Indicator	Quantifiable Measure
I	To assure an abundant supply of food grains to domestic consumers at economical prices.	
	A. Level and stability of available supplies	1. Trend in available supplies
		2. Variation around trend in available supply
	B. Level and stability of consumer prices	1. Trend in consumer prices
		2. Variation around trend in consumer prices
		3. Consumer prices relative CPI, WPI, or substitute prices
II	To stimulate and facilitate the efficient production and distribution of that combination of products and related services which best reflect the preferences of consumers and the real relative cost of production.	
	A. Level and stability of producer prices	1. Trend in producer prices
		2. Variation around trend in producer prices
		3. Producer prices relative to costs
	B. Price spreads and marketing costs	1. Price spreads--spatial and at alternative market levels
		2. Transport, handling charges, and costs
		3. Spreads relative to costs
	C. Market signals	1. Number and type of product forms and grades
		2. Grade aggregation at final sale level
		3. Buyer preferences compared to existing grades
		4. Correlation between world and domestic prices
	D. Adaptability to structural change in demand	1. Production or acreage of new or differentiated crops
		2. Output or acreage response to changes in world price
III	To increase productivity	
	A. Productivity	1. Trend in output or value added per unit of labor/capital
		2. Output relative to industry capacity
		3. Turnover or turnaround ratios for various factors
		4. Rate of technology adoption

Source: L. Martin, AJAE, December 1980.

2.4.1 The Basic Model: Lesotho/RSA

In the following model it is assumed that given its population and size of economy relative to that of RSA, Lesotho can be regarded as a "small" country. That is, it is primarily a price taker and thus cannot influence the economy of the RSA. Lesotho therefore faces a perfectly elastic demand curve for its exports to the RSA, and perfectly elastic supply curve for imports from the RSA. For most agricultural products and especially food products, Lesotho is a net importer. The exception as explained in Chapter 1 is wool and mohair, canned asparagus, and periodically some vegetables. The most important characteristics of the model is that because of the Custom Union Agreement (see Chapter 1) there are few barriers to trade except transfer costs. Another important factor is that because of higher productivity for many food products and subsidies in certain cases, the RSA produces food products at a lower price than the Lesotho agricultural food sector. The implications of this situation are outlined in the basic model, Figure 2.2.

The model is shown as a three component model, the RSA, Lesotho, and the trade sector with supply and demand functions for RSA and Lesotho respectively. It is first depicted for final food products as distinct from primary (raw) agricultural commodities. For example, one might consider the model as representing mealie meal, and processed milk, rather than maize or unprocessed milk.

Without imports (thus being self-sufficient) Lesotho would produce and consume, Q, and given its supply, S^L, and demand, D^L, curves, the market would clear at price, P^{L1}. Given import possibilities, Lesotho generates an excess demand curve, ED^L, shown in the trade component. With the RSA, excess supply curve (its supply curve that Lesotho faces), there is a demand for transfer services created, DTS (vertical difference, $ED^L - ES^R$). If transfer (largely transportation) costs are T^S, then Q^T will be imported by Lesotho. The result is that the price will fall in Lesotho from P^{L1} to P^{L2}. The price difference between the RSA and Lesotho is thus the transfer cost, $P^L - P^R = TS$. The result is to increase consumption for the product in Lesotho from Q to Q^D. It reduces the production, supply in Lesotho, from Q to Q^S, or Q^T.

In terms of economic welfare, it has important distributional effects. It adds to consumer surplus -- area $P^{L1}abP^{L2}$. This can be especially important in a country where the food is a basic food and where there are nutritional deficiencies. The losers are the producers of the food product in Lesotho. The producer surplus loss is $P^{L1}acP^{L2}$. There is thus a net welfare gain to Lesotho of area abc.

2.4.2 Trade Implication for Marketing and Primary Producers

The model shown in Figure 2.2 needs to be extended to illustrate the implications for the marketing sector in Lesotho and primary producers (farmers). This is done simply by considering a primary supply curve at the farm level, that is, connected to a derived supply at retail (or final consumption) by the costs of all marketing (and

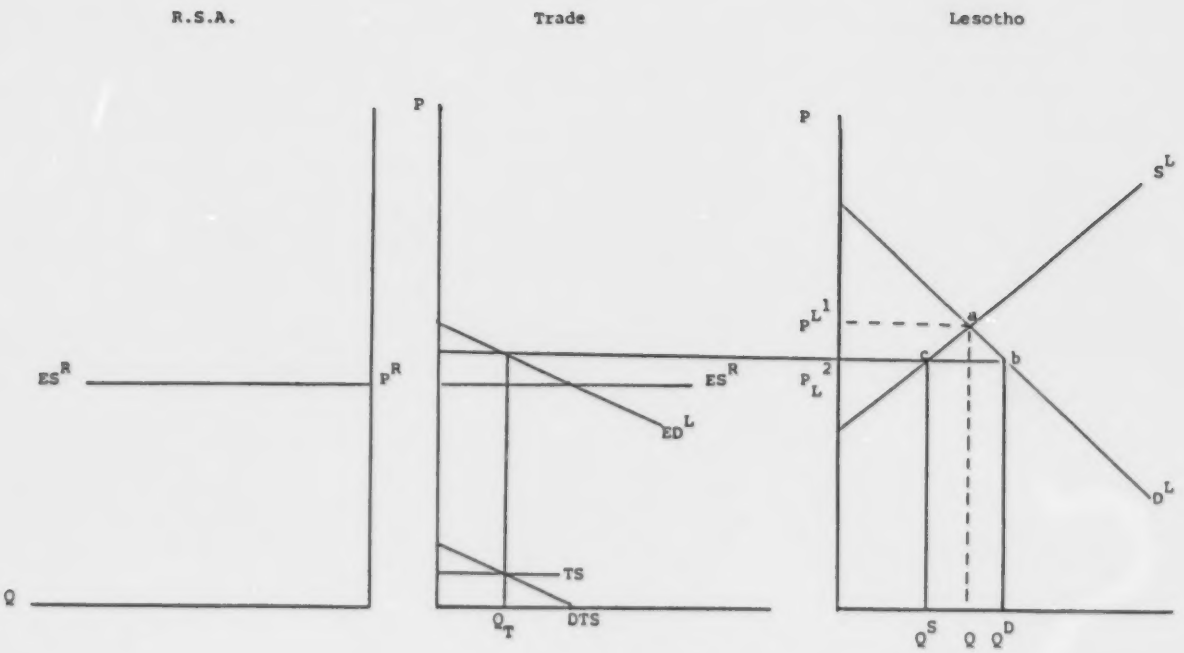

Figure 2.2: Illustration of Trade Impacts on the Lesotho Agricultural Economy

processing) services. This is shown in Figure 2.3.

Here the primary demand at retail PD^{RL}, must be distinguished from the derived demand at the farm level DD^{FL}. Similarly the primary supply at the farm level, in Lesotho, PS^{FL} is distinguished from derived supply at retail (final consumption) as DS^{RL}.

An important question is what happens to marketing costs with smaller levels of production with trade, compared to a situation without trade. If there exist economies of scale (size) in the provision of marketing services, (transportation, storage, processing and facilitating services such as credit information) then imports will result in higher per unit costs for marketing Lesotho-produced primary agricultural products. This is illustrated in Figure 2.3 where the primary and derived functions are more divergent toward the vertical axis, that is, for lower levels of production.

This has particular consequences for farmers in Lesotho, as they suffer greater losses in producer surplus than was depicted previously. This can be seen by comparing producer surplus loss of $P^{L1}acP^{L2}$ (shown previously in Figure 2.2) with $P^{FL1}deP^{FL2}$, which is the producer welfare loss at the farm level.

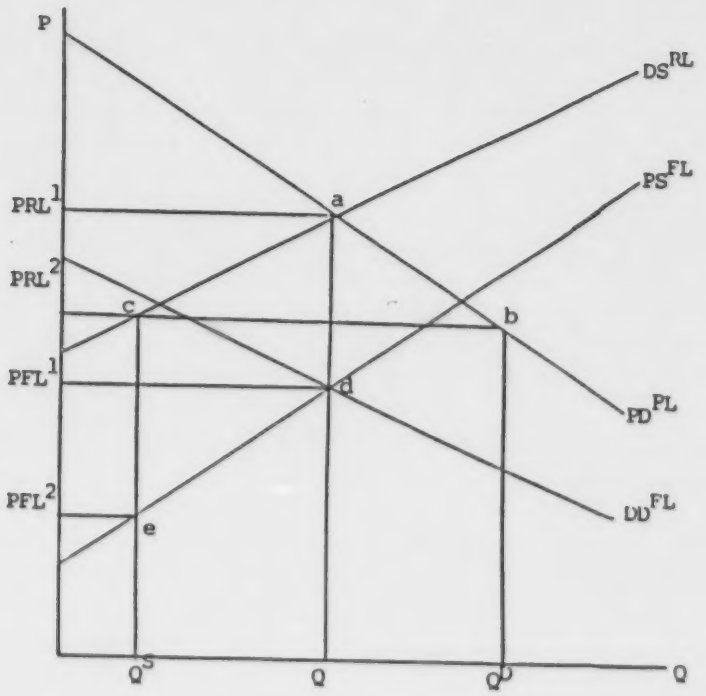

Figure 2.3: Illustration of Impacts of Agricultural Trade on Primary Producers in Lesotho.

This results because the per unit marketing cost under no trade at Q, is ad compared with per unit marketing costs at Q^S of ce, where ce > ad. It follows that the price gap between consumers and farmers in Lesotho widens with imports for Lesotho based products.

What is the consequence for the agricultural food sector in Lesotho? As Meissner (1989) and others have discussed, marketing makes an important contribution to a country's economy. As a result of imports Lesotho loses an important value added component. The loss is shown as a reduction from area $P^{RL1}adP^{FL1}$ to $P^{RL2}ceP^{FL2}$.

2.4.3 The Long Run Dynamic Implications

An important question is what are the implications for the agricultural and food sector in Lesotho in the long run from its dependence on food supplies for the RSA. This is a very difficult question as it requires an understanding of the complexities of agricultural development. In the case of Lesotho, it requires an understanding of the structural behaviour, and hence, performance of Lesotho's agricultural industry. It gets at the questions that were raised in the previous section about the importance of the

development of the marketing sector for agricultural development itself.

It is argued here that the loss of both marketing surplus and producer surplus over time is likely to hold back general agricultural development in Lesotho. First are the static effects of reduced incentives to farmers through lower prices for agricultural products. Only the very efficient, low cost producers, will remain in commercial production. Another problem is the effect of reduced production of agricultural commodities that marketing services will not be available to handle production. This would add to the risk of the farmer from producing beyond the household requirements. It can be argued from experience that this is a current constraint to increased production in Lesotho.

Second are the dynamic effects. One needs to think of what the effect of reduced producer and marketing welfare implies, especially over time. What a country with an inefficient and low productivity requires is increased investment capital. This capital must come from internally generated surplus or imported investment capital, likely from donor agencies in the case of a developing country. It can be argued, as it is shown by Tuoane (1989) and others, that low productivity in agriculture results from the failure by farmers to adopt new technology. The lack of demand for new technology at the farm level itself has implications for the marketing (and production) of new technology in the form of inputs.

The new technology envisaged is of all forms, biological, chemical, mechanical, and institutional. If developed and adopted it would result in increased agricultural productivity, that is, higher crop yields and higher outputs of livestock products. This would help to shift the primary supply curve downward if the current efficient producers would also benefit from the new technology, and to the right as more inefficient producers adopted the new technology.

It is also argued that the marketing sector gains both directly and indirectly. First it is assumed that new technology in the form of new infrastructure would result from investment in agricultural marketing. This could come in the form of better roads and transportation, storage facilities, and more efficient and modern processing facilities.

Marketing services would gain from more efficient utilization in terms of employment of marketing facilities. This would result in a reduction in the marketing margin between producers and consumers for the same level of marketing services per unit. However as was shown in section 2.1, as an economy matures more marketing services, usually in the form of greater processing, are required and thus marketing margins do increase. What is being discussed here is somewhat different.

The results of these dynamic effects are illustrated in Figure 2.4. For the sake of simplicity it is assumed that there is no change in demand in the domestic sector, or in the importing country. The new supply functions following from technological change are shown as PS^{FL1} and DS^{RL1}.

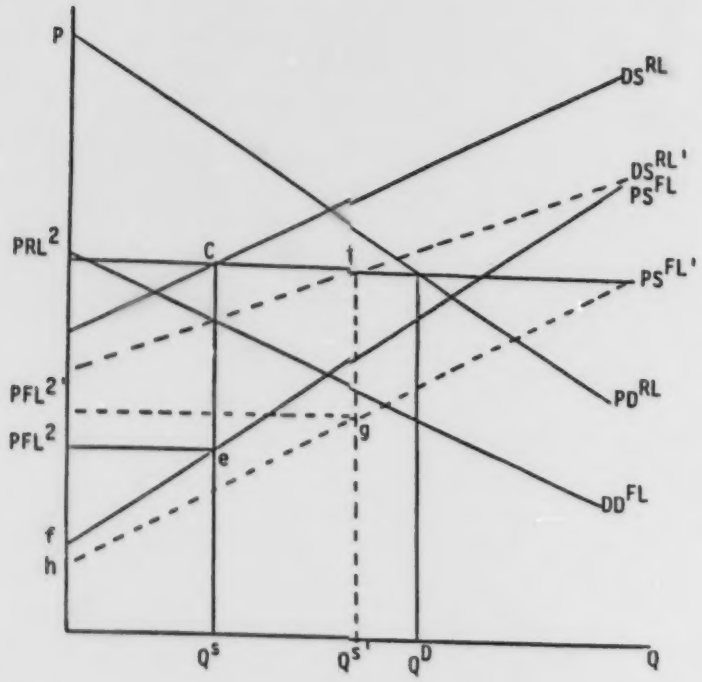

Figure 2.4: Illustration of Impacts of Technological Changes on the Agricultural Economy in Lesotho.

With static demand, and facing the same import price of food, P^{RL2}, the effects of the new technology and shifted supply curves, means that Lesotho moves toward greater self-sufficiency. Production is shown to increase from Q^S to Q^{S1}. Imports thus decline from Q^D-Q^S to Q^D-Q^{S1}.

The most important effect is for the gain in surplus by both producers and marketers in Lesotho. Producer surplus increases from P^{FL2}ef to $P^{FL2'}$gh partly because of the increased price to producers. Because of the increase in the efficiency of marketing, the per unit cost of marketing decreases from ce to ig. This would suggest a decline in marketing revenue, but because of increased production, total marketing revenue increases from P^{RL2}ceP^{FL2} to P^{RL2}ig$P^{FL2'}$.

The model clearly illustrates the importance of agricultural development in Lesotho. It further illustrates how an improvement in marketing of inputs in terms of providing new technology to farmers in the form of higher yielding varieties of grain, better quality livestock, improved farm technology in terms of farm equipment, as well as farm chemicals (pesticides and herbicides) results in increased productivity. This is

shown as a shift in the primary (farm) supply curve to the right. It is for these reasons that it is important for Lesotho to develop the policies that will aid in the development and adoption of new technology. As was outlined in the first part of the chapter, one of the more important factors is the development of new institutions. This is especially important for solution to the livestock/range problems presented in Chapter 4.

3

MARKETING, LIVESTOCK DEVELOPMENT, AND RANGELAND UTILIZATION

Brent Swallow

3.1 Introduction

3.1.1 Problem Setting

Lesotho's livestock industry has long been a vital component of the economic and social structure of the nation. When the first Europeans arrived in Lesotho at the beginning of the nineteenth century, they discovered a people who were primarily agriculturalists. Ownership of livestock wealth -- in the form of cattle, boer goats, and fat-tailed sheep -- was concentrated in the hands of the chieftaincy. This concentration was in part a result of the turmoil of the lifaqane[1] wars. The Lesotho nation emerged from the aftermath of the lifaqane under the leadership of Moshoeshoe. Moshoeshoe and the other Basotho chiefs distributed livestock assets to lesser chiefs and commoners through the social institution of mafisa. These mafisa transactions expanded and enforced Moshoeshoe's political base while giving him access to an expanded area of rangeland resources. In return for their political patronage, the recipients of mafisa animals gained access to livestock assets with which to take advantage of the extensive rangelands of Lesotho. Livestock provided milk, meat, dung, and leather products (Eldredge 1986).

In the middle of the nineteenth century the introduction of the plough, and the concurrent expansion of food demand on the South African gold and diamond mines, generated additional demands for cattle within Lesotho and contributed to the rapid expansion of cultivation and food production in the lowland regions of the country (Murray 1981). In the 1860s and 1870s Basotho began to acquire mohair-producing angora goats and wool-producing merino sheep through theft and purchase from white farmers. Attractive markets for wool and mohair prompted rapid adoption of these new breeds. Grazing pressure from additional animals was partially accommodated through the establishment of cattle posts in sparsely-populated mountain areas. The populations of cattle, sheep and goats rose steadily between 1890 and 1930. Since 1930 livestock numbers have fluctuated but have not since reached their 1930 levels. Over the last forty years the goat population: sheep population ratio has increased.

Besides marking the pinnacle of Lesotho's livestock populations, 1931 also marked the beginning of explicit government concern with the deterioration of Lesotho's rangeland resources. The 1935 Pim report on the Financial and Economic Position of Basutoland noted erosion and overgrazing as among the most serious economic

[1]Lifaqane were wars fought between the ethnic groups of Southern Africa in the 1820s.

constraints facing Lesotho. The Pim report prompted An Ecological Survey of the Mountain Area of Basutoland by Staples and Hudson in 1938. Staples and Hudson concluded that overgrazing had caused, mostly within the previous 25 years, the encroachment of chrysocoma tenuifola into approximately 750,000 acres of mountain rangelands. Exposure of bare rock and expansion of relatively less palatable species had affected an additional 700,000 acres. The livestock carrying capacity of affected areas was reduced, by 50 percent in chrysocoma-affected areas and by 25 percent in other areas. Staples and Hudson recommended a variety of measures to alleviate this overgrazing problem including: (1) the strengthening of controlled grazing arrangements; (2) limitations of livestock numbers within mountain grazing areas; (3) the introduction of a stock tax or grazing fee; (4) a program of range management experiments; and (5) the development of "properly organized" livestock markets. They estimated the "carrying capacity" of Lesotho's rangeland "with present methods of grazing, but with proper distribution of stock" to be 5.324 million small stock units. This compares to the 1931 and 1936 estimates of livestock populations: 7.762 million and 4.29 million small stock units.

Subsequent analysts of Lesotho's livestock industry have re-emphasized the problem of overgrazing -- recent estimates of carrying capacity have ranged from 390,000 to 630,000 large stock units (LASA 1978). It is frequently postulated that the customary system of rangeland tenure and the lack of formal market outlets for livestock are the major factors contributing to the overgrazing. Following recommendations (1) and (2) from Staples and Hudson (1938), the government has attempted to implement a system of controlled grazing in the mountain areas. This system was designed to relieve some degraded areas from grazing and enforce a system of rotational grazing in other areas. In the early 1970s a grazing permit system was introduced to help monitor seasonal movements of livestock. Permits are issued by Principal Chiefs and specify the number of animals that may be moved to a summer cattle post, the permitted location of grazing within a dip tank area, and the number of animals that may be grazed. Under the "Range Management and Grazing Control Regulations" of 1980, Principal Chiefs are to work under the direction of officers of the Ministry of Agriculture in enforcing a strict set of grazing controls.

In the last decade of the colonial era a series of reports reiterated the importance of improving formal livestock markets to reduce livestock grazing pressure (Brossard 1955; Stutley 1960; Biggs 1964; Basutoland National Council 1964). A variety of market development projects and programs have been initiated on the premise that increased market outlets would prompt reductions in livestock numbers. The Overseas Development Administration and the Ministry of Agriculture (1980) based a proposal for a comprehensive livestock production and marketing program on the premise that the current low rate of commercial offtake is due to "... the apparent incompatibility which exists between people's socio-cultural reasons for holding livestock and their perceptions of livestock as commercial enterprise (p. 7)." A program of cattle auctions, a small feedlot, and an abattoir supported by the Thaba-Tseka Mountain Development Project were justified on the grounds that they would result in destocking and

transformation of the traditional subsistence society into a modern cash economy. A justification for the large abattoir recently constructed near Maseru is that its operation would result in "relieving the pressure on the land by reducing stock and improving management and by raising the income of livestock farmers" (UNDP and FAO 1981, p. 3).

3.1.2 Objectives

It was within this physical and intellectual context that the livestock component of the Agricultural Marketing Research Project begun. The initial research objective was to evaluate the performance of the Lesotho cattle marketing system and evaluate the potential role of that system in the sustainable development of the livestock industry. Insights gained in the initial stages of the research resulted in the eventual pursuit of a broad objective: to provide public and private decision makers in Lesotho with information and insights important for the development of the Lesotho livestock/rangeland complex. Subobjectives pursued include the following:

(1) describe the development and current status of the production and marketing systems for livestock and livestock products;

(2) review alternative conceptual frameworks of the livestock production-utilization-marketing system;

(3) develop a conceptual model of rangeland utilization and tenure that incorporates economic, biological and ecological elements; and

(4) prescribe policies, particularly regarding marketing and range management, appropriate to the meeting of development objectives in the livestock sector.

3.1.3 Research Methods

The research project was divided into three components. The first component involved an extensive review of relevant Lesotho and international literature. This review determined the state of the art of social science literature related to livestock and range development in Lesotho and established a conceptual foundation on which further analysis was based. A summary of some of the salient points of the international literature was reported in the report on Cattle marketing in Lesotho, in the paper "Cattle Marketing Policy in Lesotho" in the ILCA ALPAN series, and in an article published in the SADCC Soil and Water Conservation Newsletter Splash.

The second and largest component of the project was a survey of 537 livestock-owning households located in 18 cluster areas randomly selected from 6 geographic areas. Information was gathered on a variety of components of the livestock system -- technical, social, financial and demographic -- all within a conceptual framework that views livestock as investments and economic factors as driving the overall system (see

Appendix A). These data are presented in a report entitled A Survey of the Production, Utilization and Marketing of Livestock and Livestock Products in Lesotho.

The third component of the project -- interpretation of a broad range of historical, aggregate and survey data -- is the focus of Livestock Development and Range Utilization in Lesotho. That report presents partial budgets for cattle, sheep and goat enterprises, an analysis of livestock owners' attitudes, and a conceptual model of the livestock/rangeland complex that is consistent with the treatment of livestock as economic investments. That model is used to analyze a number of livestock and range development programs.

3.1.4 Organization of Chapter

This chapter draws upon all of the previous documents and presents some original analysis. The presentation proceeds as follows: First, aggregate data on the Lesotho livestock system are presented and the relative importance of alternative marketing channels are discussed. Second, partial budgets for cattle, sheep and goat enterprises are constructed. Third, alternative conceptual frameworks for evaluating the economics of livestock production and marketing are reviewed and evaluated. Fourth, a dynamic model of rangeland utilization and tenure is developed. A model of "limited access" is argued as being more appropriate to the Lesotho case than either the "open access model" or the "common property model." Fifth, an attempt is made to specify the model for the case of Lesotho. Finally, a number of alternative development programs are evaluated using the model.

3.2 Description of the Lesotho Livestock Industry and Marketing System

3.2.1 Historical Development

The end of the lifaqane wars in 1824 marked the beginning of the historical development of Lesotho under-the guidance of Paramount Chief Moshoeshoe I. Basotho rapidly expanded their cultivation of the fertile lowlands area of the country and traded surplus food grain for cattle and manufactured goods. Through trade, natural increase, and raids on neighbours, Lesotho's livestock population expanded. The goat population peaked in 1911, the cattle population in 1921, the sheep population in 1931. The 1930 to 1965 period was marked by large fluctuations, but generally cattle and sheep herds declined while the goat herd increased. The early 1970s was a period of herd construction, and the early 1980s another period of herd reduction (Figure 3.1).

While Lesotho has historically been a net importer of cattle, there have been four periods since 1900 when significant net exports have been reported: 1916-1920, 1930-1937, 1952-1955, and 1966-1974. Exports have often been large even in years with net imports. Between 1933 and 1973 cattle exports averaged over 10,000 head per year. Since 1973 cattle exports have been at historical lows (Figure 3.2).

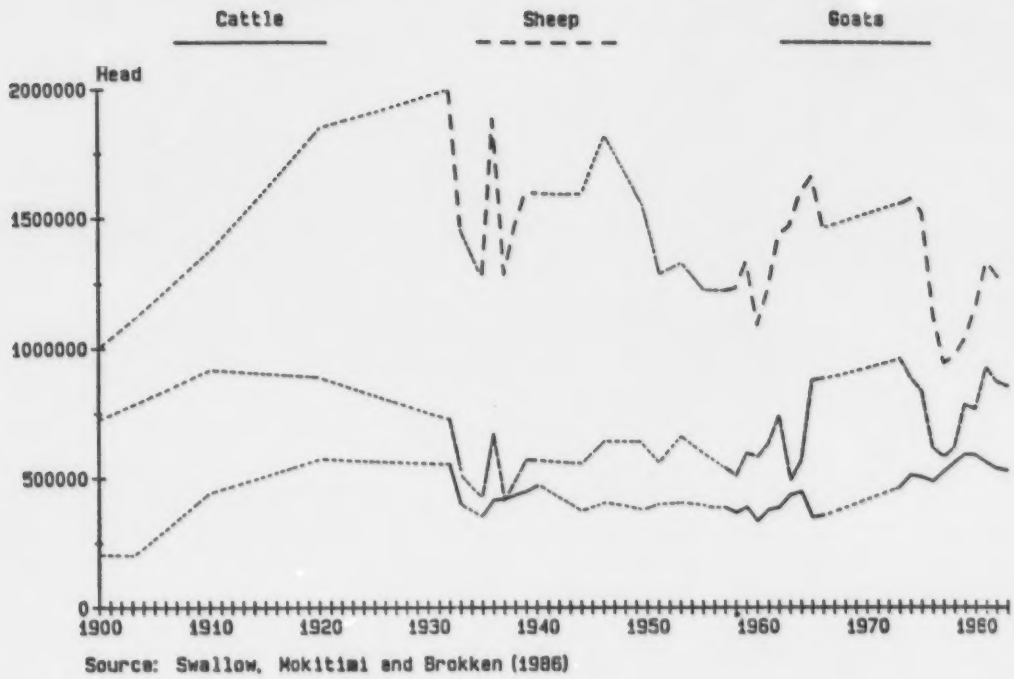

Figure 3.1: Lesotho Populations of Cattle, Sheep and Goats, 1900 to 1983

Prior to Lesotho's independence in 1966 private traders -- private trading stations, itinerant traders (hawkers), butchers and speculators -- dominated formal marketing channels for all livestock and livestock products (see also Chapter 6). Cattle were exported to South Africa where they were utilized by traders and farmers as draught animals or slaughtered by butchers. Speculators exchanged cash or young animals (tollies) for the older oxen sold by Basotho.

Between the late 1930s and early 1950s the Department of Agriculture held auctions in various locations throughout the country. The main buyers at these sales were South African traders who in turn sold to South African butcheries. In 1956 the Department of Agriculture attempted to force all cattle sales through its auctions. This one-channel system was terminated in 1957 due to low volume and competition. The failure of the "one-channel marketing system" prompted private traders to organize sales on their own and cooperative marketing societies to send members' cattle under consignment to South Africa. Cooperative marketing societies operated under the umbrella of the Basutoland Cooperative Banking Union (BCBU).

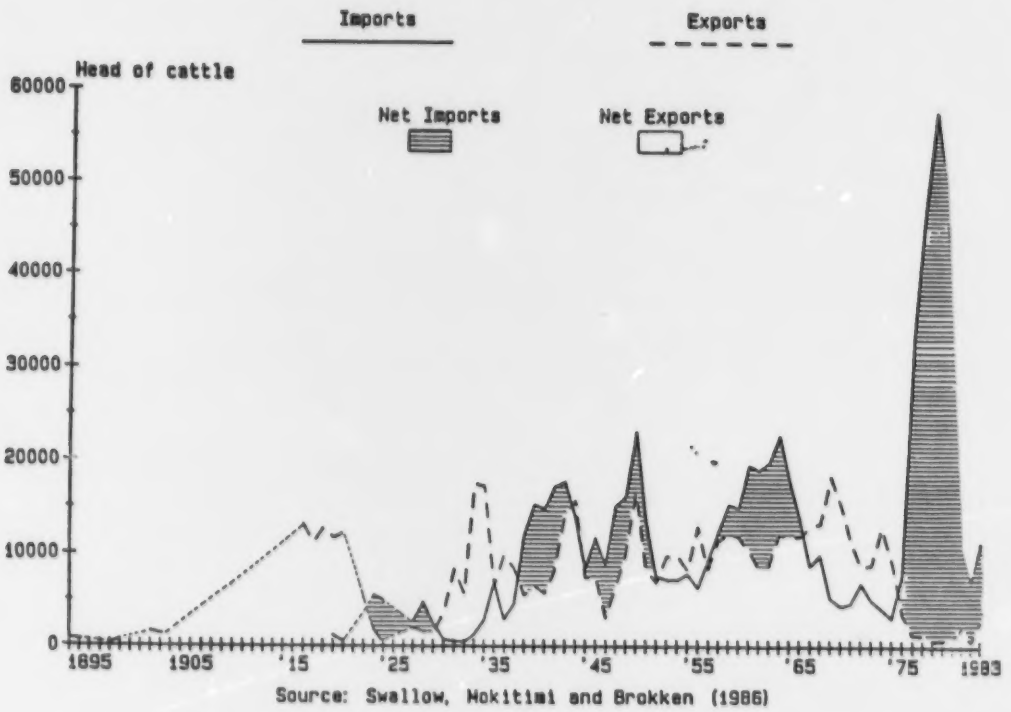

Figure 3.2: Lesotho Exports and Imports of Cattle, 1893 to 1983

Since the early 1960s there has been a series of government organizations involved in livestock marketing. Between 1963 and 1980 a succession of no fewer than five parastatal organizations were assigned the mandate of marketing Lesotho livestock and livestock products. Some of these were legislated to be the only legal market for livestock in the country. Finally, in 1980 the Livestock Products Marketing Service (LPMS) for established to facilitate, but not control, farmer marketing of livestock, wool and mohair. It now continues to facilitate that trade without the sanctioned monopoly power of some of its predecessors. LPMS now holds auction sales at points throughout the country at which the government-owned National Feedlot/Abattoir Complex is the dominant purchaser. The National Feedlot and National Abattoir were opened, respectively, in early 1983 and late 1985.

3.2.2 Government Involvement in the Current Marketing System

The Livestock Products Marketing Service employs an auctioneer who conducts auction sales for cattle and sheep at 25 sales points around Lesotho. The LPMS is also responsible for transporting animals to the buyers' locations. Animals are trekked from most locations. For those services the LPMS charges a six percent commission. A tax

of M2.50 is levied on each animal exported from the country.

Between 1980 and 1985 an average of about 2,000 cattle were marketed each year through the LPMS auction sales, mostly during the months from March to May when cattle are in their best condition. Almost all of the animals sold at these sales were male (15 percent bulls, 85 percent oxen) and relatively old. The average weight of animals sold in 1986 was 426 kilograms. Animals exchanged at a location farthest from Maseru (Mokhotlong), trekked 14 days to Hlotse, and trucked a half-day to Maseru, were found to lose an average of 8 percent of their body weight (Swallow, Mokitimi and Brokken 1986).

The dominant purchaser of animals at the LPMS auction sales is the National Feedlot/Abattoir Complex. The number of animals purchased at the auctions is not sufficient, however, to make either the feedlot or the abattoir viable. Additional animals are purchased directly from Lesotho livestock owners and from South African farmers for fattening and slaughter. The abattoir sells slaughtered animals to licensed butchers in the Maseru area and slaughters animals on consignment from those butchers.

3.2.3 Market Channels Utilized by Butcheries

Over 600 licensed butcheries handle livestock and meat products in Lesotho, 540 of which are located in the seven lowlands districts. Between 1979 and 1983 these butcheries handled, on average, over 12,000 cattle and 78,000 sheep per year (Unpublished data from the Bureau of Statistics). Animals are slaughtered by the butcheries themselves or at municipal abattoirs, the largest of which is now the National Abattoir. Some only purchase carcass portions from other butcheries. Meat prices are set freely and generally without grade. Shortly before the opening of the National Abattoir, the most important market channels through which Maseru butcheries purchased cattle, goats, and pigs were: the National Feedlot (64 percent of cattle), South African farmers (11 percent of cattle, 81 percent of sheep, and 25 percent of pigs), Lesotho farmers (7 percent of cattle, 8 percent of sheep, 25 percent of pigs), and South African feedlots (11 percent of cattle) (Unpublished data from the Ministry of Agriculture Research Division).

3.2.4 Market Channels Utilized by Livestock Producers

Some insight into the relative importance of the government-dominated marketing system to Basotho livestock producers is provided by analysis of aggregate disposition data. Unpublished data from the Bureau of Statistics indicate that an annual average of 66,834 cattle died and 16,451 cattle were slaughtered by rural livestock owners between 1979/80 and 1982/83. Comparison of these data with the LPMS auction sale data reveals that the auction system handles a very small percentage of the cattle that leave Lesotho herds each year. From these data it is clear that the financial and material resources devoted to the development of the government-controlled marketing

system have had little impact on the behavior of rural Basotho livestock owners. If Basotho are not utilizing the government-controlled marketing channels, what market channels do they utilize?

Answers to this question are revealed by the data collected by the livestock owner survey that was conducted jointly by the Agricultural Marketing Research Project at the Institute of Southern African Studies and the Farming Systems Research Project and Research Division of the Ministry of Agriculture. Between June and September of 1985 a detailed questionnaire was administered to 537 livestock-owning households. A detailed description of the survey methods is presented in Appendix A. The data presented here is summarized in the report entitled A Survey of the Production, Utilization and Marketing of Livestock and Livestock Products in Lesotho.

Of the 537 interviewees, 462 reported ownership of an average of 7.46 cattle, 250 reported ownership of an average of 54.6 sheep, 235 reported ownership of an average of 37.5 goats, 273 reported ownership of an average of 2.4 horses, and 250 reported ownership of an average of 2.5 donkeys. Total inventories for all households were 34,47 cattle, 13,654 sheep, 8,008 goats, 644 horses, and 617 donkeys. Adult females accounted for 58.4 percent of all cattle, 64.6 percent of all sheep, and 72.4 percent of all goats, indicating strong tendencies to select males for slaughter and sale and females for retention and herd construction.

Survey respondents were asked to report the sources of additions and subtractions to their livestock herds that occurred during the 12-month period stretching from June 1, 1983 to May 31, 1984. Livestock were added through births, purchases, trades, gifts, or bridewealth payments transfers (bohali). Animals were subtracted through death, gifts, bohali transfers, sales, trades, home slaughter and theft. (Respondents were willing to provide information on losses due to theft but for obvious reasons no attempt was made to question respondents on herd increases due to theft.)

The largest source of additions to livestock herds was surviving births, even though the ratio of surviving births to adult females was low for all species: 18.2 percent for cattle, 18.3 percent for goats, and 23.9 percent for sheep. Of a total of 592 animals added to cattle herds during the year, 381 were surviving births, 114 were purchased or traded, and 97 were received as gifts or as parts of bohali payments. Of 2,359 sheep added to sheep herds, 2,106 were surviving births, 200 were purchased or traded, 43 were received as gifts or bohali, and 10 were received as payment for herding. Of the 1,210 goats added during the year, 1,074 were surviving births, 98 were purchased or traded, 36 were received as gifts or bohali, and 2 were acquired in other ways.

Animals were subtracted from herds in a variety of ways. For cattle the sources of herd subtractions were as follows: death -- 177, gift/bohali -- 93, sold/traded -- 100, slaughtered -- 89, stolen -- 54, and payment to herder -- 4, for a total of 517 animals. Sources of sheep subtractions were: death -- 329, gift/bohali -- 102, sold/traded -- 540, slaughtered -- 578, stolen -- 487, payment to herders -- 271, and lost -- 1, for a total of

2308 animals. Sources of goat subtractions were: death -- 272, gift/bohali -- 156, sold/traded -- 186, slaughtered -- 257, stolen -- 96, and lost -- 25, for a total of 992 animals.

Survey respondents were asked to give additional detail on the sources of animals purchased and the destinations of animals sold. These data indicate that most animal exchanges occur between livestock owners, with some net importation from South Africa. Sources of 111 of the 114 cattle purchased by the respondents were: farmer in same village -- 36, farmer in another village -- 33, South African seller -- 35, Ministry of Agriculture -- 8, and National Feedlot -- 2. Sources of 183 of the 200 sheep purchased were localized: farmer in same village -- 135, farmer in another village -- 18, South African seller -- 2, and other -- 28. Sources of 88 of the 98 goats purchased were: farmer in same village -- 65, farmer in another village -- 19, South African seller -- 2, and other -- 2.

Market outlets for animals sold by respondents were similarly localized. Of a total of 100 cattle sold by respondents, 52 were purchased by farmers in the respondents' villages, 30 were purchased by farmers in other villages, 1 was purchased by a South African purchaser, and 16 were purchased by local butcheries. Of the 540 sheep sold, 359 went to farmers in the same village, 107 went to farmers in other villages, and 35 were sold at rural auctions. Almost all (169) of the 186 goats that were reported sold went to farmers in the sellers' own village.

The data on livestock acquisition, disposition, purchase and sale indicate that Basotho livestock owners acquire and dispose of their animals in a variety of ways including occasional purchase and sale. The data also indicate that most purchases and sales do not represent net export of animals because most exchanges involve livestock owners as both purchasers and sellers. From the perspective of rural livestock producers, these thinly-traded local market channels are far more important than the government-controlled market channels through which animals are moved out of the rural areas in which they are produced.

3.3 Partial Budgets for Cattle, Sheep and Goat Enterprises

Lesotho's livestock populations generate a variety of valuable products: cattle produce dung (which is a vital energy source in rural Lesotho), draught power, milk, progeny, and meat (from both slaughtered and fallen animals); sheep produce wool, progeny, and meat; goats produce mohair, progeny and meat; horses and donkeys produce transportation services, progeny and meat. The relative values of each of these products are very important for formulating policies to direct livestock development efforts. In this section budgets for cattle, sheep and goat enterprises are presented that establish those relative values. In addition, the budgets generate 'bottom-line' results regarding the profitability of alternative enterprises, and give insight into the motivations of Basotho livestock owners.

Table 3.1: Enterprise Budgets for the Extensive Production of Cattle, Sheep and Goats by 537 Livestock-owning Households in Lesotho

	Cattle	Sheep	Goats
Production and Inventory Conditions			
Species owners in sample	462	250	235
Average number per all livestock holding	6.42	25.4	16.4
Average number per species holding	7.46	54.6	37.5
Inventory -- males	361	585	784
-- castrates	1072	4255	2168
-- females	2014	8814	5856
-- total	3447	13654	8088
Disposition -- males lost or stolen	30	236	76
-- female lost or stolen	24	252	45
-- males died	71	108	135
-- females died	125	221	137
-- males marketed	75	271	94
-- females marketed	25	269	92
-- males slaughtered	46	416	181
-- females slaughtered	41	162	76
Acquisition -- progeny surviving	381	2106	1074
-- males recruited	63	49	10
-- females recruited	51	151	87
Cows milked	422	-	-
Average yearly milk collection per cow	92 l.	-	-
Number of oxen span days -- ploughing	3932	-	-
-- planting	2208	-	-
-- cultivation	2537	-	-
Animals clipped		9739	6327
Wool / mohair sold per animal clipped (kg)	-	2.08	0.76
Production of Cash Products			
Males marketed	75	271	94
Females marketed	25	269	92
Hides / skins marketed	30	99	56
Households selling milk	16	-	-
Milk sold per household selling milk	46 l.	-	-
Cows milked per household	1.72	-	-
Dung sold	nil	-	-
Draught sold	Unknown	-	-
Total wool / mohair sold	-	20,257	4,809
Production of Non-cash Products			
Males slaughtered	46	416	181
Females slaughtered	41	162	76
Hides / skins used in household	253	497	404
Fallen males consumed	117	95	113
Fallen females consumed	67	194	113
Dung consumed as fuel	384,846 kg	-	-
Own milk consumed in household	73,048 l.	-	-
Oxen span days	8677	-	-

.../continued

Table 3.1 (continued)

	Cattle	Sheep	Goats
Product Prices or Imputed Prices (Maloti/unit)			
Male sale price (head)	335.64	55	44
Female sale price (head)	236.39	55	44
Male purchase price (head)	437	68.75	55
Female purchase price (head)	388	68.75	55
Male inventory value (head)	251.73	41.75	41.75
Female inventory value (head)	177.29	41.75	41.75
Milk sales price (litre)	0.35	-	-
Dung value (kilogram)	0.083	-	-
Hide or skin value (not sold)	6.50	1	1
Hide or skin value (sold)	6.50	2	1.5
Oxen span draught value (draught span day)	7.93	-	-
Kraal and cattle post value (post & kraal)	400	200	200
Wool / mohair value (kilogram)	-	2.31	10.97
Investment, Costs and Returns (Maloti)			
Investment -- Kraals and cattle posts	184,800	50,000	47,000
-- males	90,875	202,070	123,246
-- bulls	269,855	-	-
-- females	357,062	367,985	244,488
Total investment	902,592	620,055	414,734
Animal capital cost (4% of investment)	28,712	22,802	16,589
Cash Costs			
Hired labour	23,440	18,561	11,031
Veterinary supplies and medicine	6,170	4,915	2,912
Salt	7,583	6,008	3,559
Purchased fodder	3,536	437	393
Other supplemental feeds	2,288	283	254
Purchased herd recruits	47,319	13,750	5,335
Total cash costs	90,336	43,954	23,484
Non-cash Costs			
Family herding labour	57,974	45,907	27,282
Own feeds	14,544	1,748	1,572
Total non-cash costs	72,518	47,655	28,854
Total enterprise costs	191,566	114,411	68,927
Total costs per animal	55.75	8.38	8.52
Total costs per average herd	415.90	457.55	319.58
Gross cash income			
Male animal sale	25,173	14,905	4,136
Female animal sale	5,910	14,795	4,048
Milk sale	443	-	-
Draught rental	Unknown	-	-
Hides / skins sale	195	198	84
Wool / mohair sale	-	46,794	52,755
Total value of cash products	31,721	76,692	61,023

.../continued

Table 3.1 (continued)

	Cattle	Sheep	Goats
Gross non-cash income			
Products from -- slaughtered males	15,439	22,880	7,964
-- slaughtered females	9,692	8,910	3,344
-- fallen males	17,873	3,919	3,729
-- fallen females	22,162	8,003	3,729
Hides / skins used in household	1,645	497	404
Own milk consumed in household	25,567	-	-
Oxen draught power	68,809	-	-
Kraal dung consumed in household	31,942	-	-
Total value of non-cash products	193,129	44,209	19,170
Value of net change in capital assets			
Male animals	8,055	2,964	2,547
Female animals	4,610	12,525	11,440
Net change in value of capital assets	12,665	15,489	13,987
Summary Financial Statistics			
Total income	237,515	136,390	94,180
Total income per animal	68.90	9.99	11.64
Total income per average sized herd	514.03	545.40	436.67
Total quasi-rent generated by enterprise	45,949	21,979	25,253
Quasi-rent earned per animal	13.33	1.61	3.12
Quasi-rent earned per average size herd	99.44	87.91	117.00
Quasi-rent earned per animal unit	13.33	8.05	15.6
Return to capital investment (percent)	5.1	3.55	6.09

Source: Estimated

The budgets presented in Table 3.1 are primarily based on data gathered during the survey of livestock owners conducted in 1985. For the purpose of this analysis each household is treated as a component of an aggregate production unit. Total budgets for this aggregate unit and average budgets for the individual households within that aggregate unit were calculated.

The budgets show that as of July 1, 1985, the 537 households had a total of M902,592 invested in cattle enterprises, M620,055 invested in sheep enterprises, and M414,734 invested in goat enterprises, for a total investment of M1.94 million [3]. Total costs of M191,566 -- 15 percent opportunity cost of capital, 47.2 percent cash costs, 37.9 percent non-cash costs - or M55.75 per head, were incurred in generating products from the cattle investment. With that investment and variable costs, products worth a total of M237,515 were generated.

The most important products of the cattle enterprise, in order of their contribution to total value were: draught (30.6 percent), products from fallen animals (17.8 percent), live animals for sale (13.8 percent), dung for fuel (14.2 percent), milk (11.4 percent),

and products from slaughtered animals (11.2 percent). Of this total value only 14.1 percent were cash products, the remaining 85.8 percent were non-cash products. During the 1984/85 year the households incurred a small net increase in the value of the cattle capital base owing to a net increase in cattle numbers. With this net increase, total benefits exceeded total costs by M45,949, an amount equivalent to M13.33 per head or M99.44 for the average sized herd. The return to capital investment was 5.1 percent over the year.

The sheep investment of M620,055 by sample households was coupled with total variable costs of M91,609, or M6.71 per head, to produce products worth a total of M136,390. In contrast to the cattle enterprise, cash products of the sheep enterprise outweighed non-cash products by a ratio of M76,692 to M44,209. Wool alone accounted for 38.7 percent of all value. There was a net increase in the value of sheep assets of M15,489. Total benefits exceeded total costs by M21,979. This amounted to M1.61 per head, M87.91 per sheep herd or M8.05 per animal unit [4]. The return to capital investment was 3.55 percent.

The goat enterprise was similar to the sheep enterprise in terms of the relative values of cash and non-cash products, with an even higher percentage of total value being cash. The total investment in the goat enterprises was M414,784. Total costs amounted to M68,927, 24.1 percent of which were capital costs, 34.1 percent of which were cash costs, and 41.9 percent of which were non-cash costs. Total value generated was M94,180, 56 percent of which was derived from mohair sales alone, 14.1 percent from home consumption of slaughtered animals, 8.5 percent from consumption of fallen animals, and 8.7 percent from sale of live animals. Total benefits exceeded total costs by M25,253 -- M3.12 per head, M117.00 per goat herd, or M15.6 per animal unit. The return to capital investment was 6.1 percent.

Comparison of the three budgets illustrates remarkable similarities of the quasi-rent generated per animal unit, and the rate of return to capital investment. After accounting for all cash, non-cash, and investment costs, cattle generate quasi-rents of M13.33 per animal unit, sheep generate M8.05 per animal unit, and goats generate M15.60 per animal unit. Rates of return to capital investment are likewise similar: goats are the highest at 6.1 percent, cattle next at 5.1 percent, and sheep lowest at 3.6 percent.

3.4 Evaluation of Alternative Conceptual Frameworks

Three alternative conceptual frameworks are commonly employed in analyses of livestock economics in Africa. In Swallow, Mokitimi and Brokken (1987) those frameworks are called: "marketing to transform the cattle complex," "marketing to meet cash needs," and "marketing of capital assets." In this section these frameworks are reviewed and critiqued for their potential contribution to analysis of the Lesotho problem situation.

3.4.1 Marketing to Transform the Cattle Complex

> In 1926 Herskovits described the East African 'cattle complex' as follows: In East Africa, where currency in any form is absent, cattle constitute an almost exclusive hall-mark of wealth. The subsistence economy of these tribes is based on agriculture; but the number of cattle owned by a man correlates highly with his position. That is, among these people, as in most societies, position is related to wealth and cattle are the sole expression of wealth. ... A cow is eaten only on certain ceremonial occasions, or when an animal dies; nor have cattle any other subsistence ability aside from that of supplying milk, since they are never employed as beasts of burden. They are merely possessed and esteemed for the prestige their possession brings. But they are not money. (Herskovits 1926, pp. 264-265, as quoted in Schneider 1984, pp. 187-188.)

Although sixty years has elapsed since Herskovits published his article, the characterization of African cattle owners as tradition-bound and resistant to change continues to permeate development literature. Growing demands for meat and economic surplus produced by pastoralists, as well as concern about environmental degradation, has stimulated government efforts designed to prompt pastoral societies to produce more beef for external consumption. Marketing projects are often the foundation of these development efforts.

Until recently the "marketing to transform the cattle complex" was the dominant conceptual framework used to analyze livestock development issues in Lesotho. It was generally proposed that Basotho livestock owners are traditional, subsistence-oriented peasants who place great value on their cattle for social and cultural reasons. Basotho own more livestock than the carrying capacity of their rangelands so, the proposition continues, it is important that markets are established to introduce Basotho to the idea that their cattle are a marketable product, in order to allow the disposal of surplus or culled animals. This proposition has been used to justify the millions of dollars of resources devoted to the development of livestock markets in Lesotho (Bostwick, Hesling and Heady 1984; Thaba-Tseka 1981; Overseas Development Administration and the Ministry of Agriculture 1980; UNDP and FAO 1981).

The data presented above show that Basotho livestock owners have long been well acquainted with the notion of marketing their livestock, and that they continue to market significant numbers of livestock within their local areas. The partial budget analysis shows that livestock generate real economic returns and are not simply regarded as socio-cultural assets.

3.4.2 Marketing to Meet Cash Needs

The premise of the cash needs framework is that cattle are an illiquid investment which are only sold under exceptional circumstances, that is, to meet emergency cash

needs. Doran, Low and Kemp (1979) argue that the cash needs framework is appropriate for modelling the investment and marketing decisions of cattle owners in eastern and southern Africa and present empirical results to support their argument. In Low, Kemp and Doran (1980) the authors present a model in which total cattle slaughter is assumed to be a function of the size of the herd (used in ceremonies), the basic cash need, and other expenditures. Despite the statistical strength of the empirical results, however, little support was in fact provided for the cash needs hypothesis. Jarvis (1980) pointed out that the effects of all variables can be ascribed to economic forces other than cash needs. In particular, the results are very consistent with the capital asset model presented below.

Based on their results, Doran, Low and Kemp (1979) caution development agencies and governments of the potentially harmful consequences of their well-intentioned development efforts. Marketing initiatives may attract more sales through the commercial channel, but cash needs will actually be met with lower total sales. According to the authors this will result in an increased stocking rate. Development policies that increase rural incomes will likewise promote increased stocking by decreasing cash needs.

To some extent the "marketing to meet cash needs" framework is compelling. A number of stochastic variables affect the incomes and expenditures of Basotho livestock owners -- rainfall, prices, and wages earned on South African mines -- and livestock are assets from which income can be earned to smooth seasonal and yearly income. In other words, livestock are durable productive assets that can be accumulated and liquidated to smooth inter-temporal consumption. Consumption-smoothing becomes a potentially important function of productive assets in environments in which income is affected by many stochastic variables and credit and insurance markets are missing or imperfect (Rosenweig and Wolpin 1989). Informal surveys of individuals selling cattle at auction sales conducted between April 1985 and November 1986 indicated that the income from most sales were to be used to meet pressing financial demands.

Even if livestock were the only insurance substitute available to Basotho livestock owners, there are a variety of other factors that would affect livestock investment decisions. Other potential insurance substitutes include: diversification of income sources -- the livestock owners interviewed in the survey reported 25 different income sources and only 11.4 percent of respondents reported livestock as a primary source of cash income (A Survey of the Production, Utilization and Marketing of Livestock and Livestock Products in Lesotho); diversification of the species composition of livestock herds -- mixed herds of cattle, sheep and goats diversify sources and timing of income; and mafisa -- under the terms of these livestock entrustment contracts the owner and the keeper of a mafisa animal share the potential risk. In this context cash needs are best regarded as one variable, among many, that may influence the timing of livestock investments and liquidations.

3.4.3 Marketing of Capital Assets

The premise of the capital asset model is that livestock owners regard their animals as capital assets that produce a stream of valuable products while held and have a capital value when sold or slaughtered. Livestock owners determine the optimal age of sale or slaughter by comparing the expected net present value of the future stream of products with the expected value of the animal if slaughtered or sold. Conceptually the model implies that livestock owners continually make these calculations for every animal in their herds and slaughter or sell an animal when the calculation indicates a sale value greater than the net present value of the live animal. Calculations of the net present value of live animals are least complicated for production systems in which meat is the only product and more complicated in systems in which there is a complex of valuable flow and stock products. The partial budgets presented in the previous section illustrate that, in Lesotho, draught power, milk, dung and progeny are valuable flow products, while stock products include meat, offal and hides.

One of the implications of the capital asset model is that there will be a negative relationship between slaughter prices and current marketings. Everything else equal, slaughter price increases which are expected to be permanent will causes decreases in the number of animals marketed as stockowners attempt to construct inventories to increase future animal sales. In a closed market this reaction may lead to further price increases until the production from withheld animals begins to come onto the market. Increased marketings will eventually result in price decreases which will in turn prompt further sales. A cyclical pattern of herd construction (decreased marketings) and liquidation (increased marketings) is thus the predicted result of any price increase.

Lorie (1947) was the first analyst to develop the capital asset model and apply it to the United States cattle sector. Jarvis (1974) developed a more mathematical version of the model and applied it to the Argentine cattle sector. His findings of negative relationships between current marketings and current prices, and positive relationships between current marketings and lagged prices, support the application of the model to the Argentine situation. The model has also been validated as applicable to cattle industries in the Sahel (Ariza-Nino and Shapiro 1984), Botswana (Ndzinge, Marsh and Greer 1984), Zimbabwe (Rodriquez 1985), and Swaziland (Jarvis 1980).

Three separate criteria support the application of the capital asset model to the Lesotho problem setting. First, in a time series analysis of the small stock population of Lesotho, Hunter (1987) found a statistically significant positive relationship between the sheep/goat population ratio and the lagged ratio of wool returns to mohair returns. Second, examining macro-economic data, Fritsch (1984) argued that low cattle prices, low interest rates on savings accounts, and high migrant remittances all combined to generate strong economic incentive for Basotho to increase their herds of livestock, particularly cattle. The data indicate that livestock owners responded to these conditions by purchasing large numbers of livestock in South Africa and importing them into Lesotho. Third, the budgets presented in the preceding section indicated positive,

and relatively equal, returns to capital invested in cattle, sheep and goat enterprises. These returns exceeded the real rate of return on savings accounts by 15 to 20 percent (Swallow 1985). It thus appears that Basotho make wise economic decisions when they invest in livestock rather than bank savings accounts, and that they act as portfolio managers and attempt to equate the returns generated from alternative livestock investments while simultaneously spreading their production and price risks between the different species and smoothing their income streams.

3.5 A Model of Rangeland Utilization and Tenure for Lesotho

Livestock development programs instituted in Lesotho during the last 50 years have emphasized livestock marketing and rangeland tenure interventions. Livestock marketing interventions have emphasized the control of infrastructure: a number of sales yards, feed lots, and abattoirs have been constructed. Rangeland tenure innovations, on the other hand, have emphasized modifications of administrative procedures, such as the grazing permit system, and the formation of grazing associations. The premise of these innovations is that the current rangeland tenure system is essentially open access and that interventions are necessary to shape that system into an effective common property tenure regime.

Recent anthropological studies by Dobb (1985), Lawry (1988), and Shoup (1987) point out a variety of problems with the implementation of the current system of grazing control regulations and recommend modifications that would produce more effective utilization and control of the country's rangeland resources. Dobb (1985) focuses on the jurisdictional problems associated with a tenure system in which there is little correspondence between the location of livestock owners' home villages and the location of their cattle posts. He recommends a re-adjudication of grazing rights to give village residents exclusive use to contingent cattle post and village grazing areas. Lawry (1988) and Shoup (1987) note administrative problems with the current system and argue that chiefs are generally reluctant to enforce regulations on people within their jurisdictions. Lawry (1988) recommends a system of co-management in which chiefs would be given greater administrative support to adjudicate grazing rights and the national government and courts would have greater responsibility to enforce those rights and duties. Shoup (1987) cautions that conflicts between customary and government systems of authority reduce the likelihood of successful local-national cooperation. He supports instead the support of locally-enforced institutions such as he discovered in one lowland village.

In this section a dynamic model of rangeland utilization and rangeland tenure is presented and calibrated for the case of Lesotho. Three variants of the model are presented. The "open access" model and the "common property model" are presented as alternative extremes of rangeland tenure types. An alternative, here called the "limited access" model, is developed and proposed to be appropriate for the Lesotho case. It is concluded that insufficient data are available to conclusively support any of the models. It is argued, however, that the limited access model is more appropriate

than either the open access or common property models.

3.5.1 The Basis of the Open Access and Common Property Models

Rangeland tenure systems describe mechanisms for the inter-agent allocation of rangeland resources. Characterizations of African rangeland tenure systems are generally drawn from either the open access model or the common property model. The open access model suggests that users of common pool resources are caught in a social dilemma in which rational behavior for each agent is inefficient, and potentially destructive, for a group of agents. In contrast, the common property model suggests that users of common pool resources will establish institutional arrangements to ensure socially-beneficial behavior by all agents.

3.5.2 A Dynamic Model of Resource Allocation Under Open Access

The economic model often used to illustrate the resource allocation implications of open access was first developed by Gordon (1954) and applied to rangeland situations by Simpson and Sullivan (1984), Jarvis (1984), and Sommerville and Kerr (1988). Here a mathematical version of the open-access model is presented.

Suppose that a group of N identical, profit-maximizing, livestock owners have the possibility of accessing a common pool rangeland resource over an infinite number of forage growing periods. At an initial time period (t = 0) each of these livestock owners have access and must choose the number of identical animals that he will keep on that rangeland (Xit). The price per unit of animal product (P) is fixed and known. The total cost of herding for each livestock owner (Ci) is a function of the number of animals in the agent's herd. All agents know that within any period there is a linear relationship between average production of animal products (APPt), the total number of animals on the rangeland (Xt), and the forage production potential of that rangeland (At).[2] They also know that year-to-year changes in forage production potential are a function of the current production potential and stocking rate.

Agents who gain access have expectations regarding the strategic interactions between them and other agents who achieve access. In the open access model it is assumed that agents ignore the consequences of their own stocking rate actions on the behavior of other agents currently sharing the rangeland.

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[2] The relationship between average production of animal products and the number of animals stocked on an area of rangeland has been the focus of a substantial amount of research by range scientists. From a review of experimental results Jones and Sandland (1974), Sandland and Jones (1975), and Jones (1980) all concluded that " ... in the region of the response curve where pasture potential and not animal potential is limiting, gain per animal declines linearly with increases in stocking rate" (Jones 1980, p.419).

The discrete-time optimal control problem faced by each profit-maximizing agent (given the assumption of symmetry) is to select numbers of livestock for the initial period (Xi0) and for all future periods. That is, he chooses the vector $\underline{X}i$ that maximizes equation (3.1) subject to equations (3.2) through (3.7).

$$\underset{\underline{X}i}{\text{Max}} \; \sum_{t=0}^{\infty} B^t V(Xit, At, Xt) \tag{3.1}$$

$$At+1 - At = F(At, Xt) \tag{3.2}$$

$$A0 \text{ is given} \tag{3.3}$$

$$V(Xit, Xt, At) = [P * APPt - Ci] * Xit \tag{3.4}$$

$$Xt = X1t + X2t + \ldots + Xit + \ldots + Xnt \tag{3.5}$$

$$APPt = At - S * Xt \tag{3.6}$$

$$Ci = Ci(Xit) \quad \text{where } dCi/dXi > 0;\ dCi^2/dXi^2 < 0 \tag{3.7}$$

where

- B is the individual's factor for discounting future income;
- P is the fixed price per unit of livestock output;
- Ci is the total cost of input;
- Xt is the total number of animals stocked on a fixed area of rangeland in period t;
- Xit is the number of animals owned by individual i in period t (Xit = 0 for all i who do not have access in period t);
- At is a measure of rangeland potential in period t;
- S is a measure of rangeland stability.

The Lagrangian and first order necessary conditions for the livestock owner's problem in this case are equations (3.8), (3.9), (3.10) and (3.11).

$$\underset{Xit,\ At}{\text{Max}} \; \sum_{t=0}^{\infty} \{B^t V(Xit,At,Xt) + Lt+1(At + F(At,Xt) - At+1)\} \tag{3.8}$$

$$P(-S\,Xit + APPt) - dCi/dXi + B\,Lt+1\,(dF/dXt)(dXt/dXit) = 0 \tag{3.9}$$

$$B\,Lt+1 - Lt = -dV/dAt - Lt+1\,dF/dAt \tag{3.10}$$

$$A_{t+1} - A_t = F(A_t, X_t) \tag{3.11}$$

where Lt is the co-state variable.

Equation (3.11) is the equation of motion. The co-state equation (3.10) defines the time path of the co-state variable. Equation (3.9) is the optimality condition. Independent profit-maximizing herd owners add animal units to their herds until the current value of marginal product of adding an additional animal unit equals the marginal cost of input plus the marginal value (less the benefit) of foregone future profits. If, as assumed, the agent ignores the consequences of his stocking rate decisions on others' decisions, then he will assume that a small addition of animals to his own herd represents an equal addition to the total herd. That is, under open access it is assumed that $dF/dX_{it} = dF/dX_t$. $dF/dX_t > 0$ implies that additions to the total herd increase future production potential and $dF/dX_{it} < 0$ implies that herd additions reduce future production potential. Rangelands that require some grazing pressure to reduce brush encroachment or increase forage production would have $dF/dX_t > 0$ for some levels of X. It is frequently postulated that African rangelands are overstocked such that further increases in stocking rates cause encroachment of unpalatable species -- in terms of this model, $dF/dX_i < 0$. (See Sandford 1983 and Savory 1988 for critiques of this assumption.)

Equation (3.12) is the optimality condition expressed in terms of the total number of animals (X) and the proportion of the total held by the ith livestock owner (ki). As ki approaches one, depicting access by a single livestock owner, the value of marginal product for an individual (VMPi) approaches the value of marginal product for the group of livestock owners (VMP). As ki approaches zero, depicting access by a large number of livestock owners, the VMPi for the individual approaches the value of average product (VAP) for the group.

$$P(-S * k_i * X_t + APP_t) - dC_i/dX_i + B\, L_{t+1}\, dF/dX_t = 0 \tag{3.12}$$

3.5.3 A Dynamic Model of Resource Allocation Under Common Property

The definitions of common property that have recently been presented by Berkes and Farvar (1989, p. 10) and Bromley (1989, p. 205) identify three key features of common property regimes: (1) members of property-owning groups are included and non-members are excluded from access; (2) members establish how the resource should be used and are expected to abide by those rules; and (3) members and non-members have property rights and duties that are sanctioned and enforced by some collectivity. The following model of resource allocation under common property is based on these three features.

Suppose that n agents are recognized by the state as the co-owners of stream of forage and water resources that are available on a particular area of rangeland. The group has a right to exclude non-members from use of the resources and non-members

have a duty to abide by exclusion. The group has the right to establish the number of animals that each livestock owner may keep on the rangeland in any year, and individual members of the group have the duty to abide by their assigned stocking rate level. Suppose that the goal of each agent is to maximize the discounted present value of profits generated from keeping animals on the rangeland and that all agents discount future profits at the same rate. Assume that the situation is otherwise identical to that considered in the open access model.

The objective of the management group is to determine Xt for each time period so as to maximize the discounted sum of group members' annual individual profits. The Lagrangian and first order conditions for the problem are given in equations (3.13) to (3.16).

$$\underset{Xt\ At}{\text{Max}} \ \sum_{t \text{ to infinity}} \{B^t V(At, Xt) + Lt+1(At + F(At,Xt) - At+1)\} \tag{3.13}$$

$$P(-S\,Xt + APPt) - dC/dX + B\,Lt+1\,(dF/dXt) = 0 \tag{3.14}$$

$$B\,Lt+1 - Lt = -dV/dAt - Lt+1\,dF/dAt \tag{3.15}$$

$$At+1 - At = F(At, Xt) \tag{3.16}$$

Note that the optimality condition (equation (3.14)) is identical to the open access optimality condition for the case in which ki is equal to one. That is, the total resource allocation problem faced by the management group in a common property regime is identical to that of an agent who has secure exclusive access to a resource (assuming that all agents are expected profit maximizers). Once the management group determines the optimal level of total stocking rate they must allocate use rights to members of the group. Each member has the right to expect to be allocated some positive share of the total and the duty to abide by the share they are allocated.

3.5.4 The Lesotho Tenure Situation and the Concept of Limited Access

The rangeland tenure situation described by analysts such as Dobb (1985), Shoup (1987) and Lawry (1988) does not seem to be well-represented by either the common property or open access models. In law all Basotho have rights to access some area of mountain rangeland. In reality, access and use of any particular area of mountain rangeland requires the construction, maintenance and utilization of a cattle post kraal and herder hut. Once in place ownership of a cattle post gives its owner virtually unrestricted access to the forage and water resources available on that rangeland; there is no enforcement of limitations on the sizes of individual herds. This lack of collective control of individual stocking rate decisions violates the assumptions of the common property model.

The dimensions of the area that can be utilized by the owner of a cattle post are limited by the distance that animals can travel and return within the daylight hours of a single day. The ability of a livestock owner to establish a new cattle post kraal depends upon the density of established users in the local area, the social relationships between the new entrant and the established users, and the sanction of the Principal Chief. If the established users already consider themselves too closely located, if the new entrant has no strong social relationship with established users, or if the new entrant has not received proper permission, then the social sanction of established users is likely to dissuade any potential entrant from locating. Rangeland access is better described as limited access, rather than open access, in this situation. The concept of limited access is here used to refer to a resource tenure situation in which agents do not condition their actions on the expected behavior of others -- this makes it an access regime -- and in which there are some effective limits on the likelihood of any particular agent gaining access to the resource.

There is a distinction between established and potential rangeland users in the Lesotho situation. An agent who constructs a cattle post has a relatively secure expectation that she will be able to access the area surrounding that cattle post as long as she continues to use it. An agent who fails to access a cattle post in any particular year, however, faces less certain prospects in future years.

3.5.5 A Model of Limited Access

Consider the case of a group of N identical, profit-maximizing, livestock owners who have the possibility of accessing a common pool rangeland resource over an infinite number of forage growing seasons. At an initial time period ($t = 0$) each of the n livestock owners (where n is greater than zero but less than N) have access and must choose the number of identical animals that he will keep on that rangeland. Assume that each agent ignores the consequences of their own stocking rate actions on the behavior of other agents currently sharing the rangeland. Assume also that agents face uncertainty regarding their ability to access the rangeland. The n agents have secure access to the rangeland throughout the initial period but do not have secure access in future periods. Rather, each agent has subjective probabilities of the likelihood of their access to the rangeland for each future period. Assume, for the sake of simplicity, that in every period that an agent has access to the rangeland he assigns a subjective probability of h ($0 <= h <= 1$) that he will regain access in the following period, $t+1$. In every period that he does not gain access, he assigns a subjective probability of 0 that he will regain access in any following period. Apart from this issue of access uncertainty, assume that the problem is identical to the open access problem presented above.

The Lagrangian and maximum conditions for the limited access problem are given as equations (3.17) to (3.20).

$$\underset{Xit,\,At}{\text{Max}} \; \sum_{t \text{ to infinity}} \{h^t B^t V(Xit,At,Xt) + Lt+1(At + F(At,Xt) - At+1)\} \qquad (3.17)$$

$$P(-S*ki*Xt+APPt) - dCi/dXi + h\,B\,Lt+1(dF/dXt)(dXt/dXit) = 0 \qquad (3.18)$$

$$h\,B\,Lt+1 - Lt = -dV/dAt - Lt+1\,dF/dAt \qquad (3.19)$$

$$At+1 - At = F(At, Xt) \qquad (3.20)$$

Consider the optimality condition given in equation (3.18). The probability of future access (h) and the discount rate (B) affect the extent to which the individual agent takes account of future effects of current stocking. An agent's discount rate is unaffected by either the probability of future access or the number of agents sharing current access. If the agent is relatively secure about her future access (h close to 1), then she will take greater account of the future impacts. If she is relatively insecure about future access (h close to 0), then she will tend to ignore future impacts. Small ki coupled with small h represents a situation in which many agents have current access to a rangeland, all of whom are insecure about their future access ability. In this situation annual profits (land rents) will be close to zero. The lower are ki and h, the higher the equilibrium stocking rate, and thus the more likely that dF/dXt is negative at the equilibrium stocking rate.

A range of resource allocation solutions are possible in a limited access tenure regime; the actual outcome depends upon agents' expectations of the likelihood of their future access to the resource and upon the number of agents who share access. The smaller the number of agents who access an area of rangeland, the more likely it is that they will recognize their interdependence and condition their own behavior on the expected behavior of others.

3.6 Empirical Specification of the Dynamic Model of Rangeland Utilization for the Lesotho Situation

Empirical specification of the dynamic model of rangeland utilization for the 1985/86 Lesotho situation relies on a number of assumptions. The first assumption is necessary to allow application of the optimal control technique and ignores issues regarding the value of information and agents' risk behavior. The second and third assumptions, (A2) and (A3), allow specification of the cost function from information presented in the livestock budgets presented above.

(A1) No stochastic variables influence rangeland production or utilization.

(A2) All areas of rangeland in Lesotho are physically identical and equally stocked

with livestock.

(A3) Marginal cost of input per animals unit is constant for all possible stocking rates.

Assumptions (A4) to (A7) permit aggregation of all products in terms of value per animal unit and results in a linear relationship between value of average product and stocking rate measured in animal units per land area. Assumption (A8) facilitates the estimation of the parameters of that relationship.

(A4) All livestock products are assigned economic value whether they are sold or consumed by household members.

(A5) Quantities of all products produced by cattle, sheep, goats, horses and donkeys are linearly and proportionately related to changes in nutrition levels resulting from changes in aggregate stocking rates.

(A6) Output and input prices are determined in the larger South African markets and are unaffected by supply and demand conditions in Lesotho.

(A7) There is a linear relationship between average physical product and the short-term stocking rate. This assumption is supported by the empirical analysis of Jones and Sandland (1974), Sandland and Jones (1975), and Jones (1980).

(A8) Animal productivity would increase by approximately 30 percent if the stocking rate was reduced from its current rate to the rate now recommended to be the rangeland carrying capacity. This assumption is based on historical analysis of wool and mohair fleece weights conducted by John Hunter (personal communication).

Specification of the explicit form of the equation of motion (3.2) is based on the following assumptions.

(A9) The only negative ecological effect of high stocking rates is the encroachment of chrysocoma. Staples and Hudson (1938) also attribute the exposure of bare rock and the encroachment of other less palatable forage species to overgrazing.

(A10) Areas of rangeland encroached by chrysocoma have carrying capacity 50 percent lower than areas without chrysocoma. This is the same assumption made by Staples and Hudson (1938).

(A11) Within the range of stocking rates, from the current stocking rate to the rate recommended by range scientists, there is a linear relationship between the rate of change of rangeland production potential and the stocking rate.

(A12) The amount of chrysocoma-encroached rangeland increased at a constant rate between 1936 and 1986.

(A13) At the current estimate of rangeland carrying capacity (0.254 animal units per hectare) forage production potential would increase at a rate equal to its decrease between 1938 and 1988.

Estimates of the parameters of the empirical model draw from a variety of sources but most heavily from the partial budgets presented in the previous section of this chapter. Those budgets indicate that the average cost of input for extensive livestock operations in 1985/86 was 48.17 maloti per animal unit and that the value of average product was 60.05 maloti per animal unit.[3] It is estimated that in 1985/6 there were 2,193,862 hectares of rangeland and 935,598 animal units in Lesotho and that 101,430 animal units could be supported on croplands and village grazing areas (Land Conservation and Range Development Project, unpublished data 1989). From these data it is estimated that 834,168 animal units grazed on 2,193,862 hectares of rangeland, for an average stocking rate of 0.38 animal units per hectare. Therefore, at a stocking rate of 0.38 animal units per hectare the value of average product is 60.05 maloti. By assumptions (A8) and (A13), the value of average product at a stocking rate of 0.254 animal units per hectare is 78.07 maloti.

The current situation, with a stocking rate of 0.38 animal units per hectare and the value of average product of 60.05 maloti, establishes one point on the value of average product function. A second point on that function is the stocking rate of 0.254 animal units per hectare and the predicted value of average product of 78.07 maloti. By assumption (A7) the value of average product function is linear so can be fully specified from the two points.

$$VAP1985 = 114.40 - 143.02 * X1985 \qquad (3.21)$$

Estimation of the parameters of the equation of motion (equation 3.2) relies on assumptions (A9) to (A13) and historical data on the amount of rangeland subject to chrysocoma encroachment. Rangeland inventories conducted in 1936 by Staples and Hudson and in 1986 by the Land Conservation and Range Development Project together indicate an increase in the area encroached by chrysocoma from 303,521 hectares in 1936 to 362,766 hectares in 1986: a total increase of 1.195 percent or an average increase of 0.36 percent per year. By assumption (A10) the rate of loss of production potential at the stocking rate of 0.38 animal units per hectare was 0.18 percent per year. By assumption (A13) the rate of gain in production potential, at a stocking rate of 0.254 animal units per hectare, would be 0.18 percent per year. With assumption (A11), these two points establish the explicit linear relationship between

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[3] This estimate of cost includes a 4 percent opportunity cost of capital and the cost of all family-supplied inputs. Maloti is the currency of Lesotho. In 1985 the average exchange rate of one loti (singular) was U.S. $ 0.456 (F.A.O. Trade Yearbook 39).

rate of change in forage production potential and the stocking rate shown in equation (3.22).

$$\frac{At+1 - At}{At} = .00906 - 0.0286 * Xt \qquad (3.22)$$

3.7 Evaluation of Alternative Models of Rangeland Utilization and Rangeland Tenure in Lesotho

The empirical model of rangeland utilization is summarized into the value of average product equation (3.21) and the equation of motion (3.22).

$$VAP1985 = 114.40 - 143.02 * X1985 \qquad (3.21)$$

$$\frac{At+1 - At}{At} = .00906 - 0.0286 * Xt \qquad (3.22)$$

In this section that model is employed in an attempt to evaluate if the open access, common property, or limited access models appropriately describe the Lesotho situation.

First, suppose that the Lesotho rangeland is currently exploited as an open access resource by a large number of profit-maximizing livestock owners. The optimality condition is given by equation (3.12) with ki very close to zero. Setting (P*ki*Xt) equal to zero the equation can be rewritten as equation (3.23) and specified empirically as equation (3.24). The value of Lt+1 would be 3.776. That is, the individual perceives the shadow value to her of an additional unit of forage production potential to be M3.776.

$$P(-S * ki * Xt + APPt) - dCi/dXi + B\ Lt+1\ dF/dXt = 0 \qquad (3.12)$$
$$VAPt - dCi/dXi + B\ Lt+1\ dF/dXt = 0 \qquad (3.23)$$
$$60.05 - 48.17 + 0.9615 * Lt+1 * -3.272 = 0 \qquad (3.24)$$

Second, suppose that the rangeland is currently exploited as a common property resource by a group of profit-maximizing livestock owners, each of whom accepts the decision-making authority of the collectivity. The optimality condition for this situation is given by equations (3.14) or (3.25). The empirical specification is given in equation (3.26). This implies a value of Lt+1 of -4.29. That is, the opportunity of an additional unit of forage production potential is a negative M3.776. This result supports rejection of the common property model.

$$P\ (-S\ Xt + APPt) - dC/dX + B\ Lt+1\ (dF/dXt) = 0 \qquad (3.14)$$
$$VMPt - dC/dX + B\ Lt+1\ (dF/dXt) = 0 \qquad (3.25)$$
$$5.70 - 48.17 + 0.9615 * Lt+1 * (-3.272) = 0$$

Third, suppose that distinct areas of Lesotho's rangeland are currently exploited as limited access resources by small numbers of profit-maximizing livestock owners -- in Dobb's case study he found 17 cattleposts within a particular well-defined area of rangeland -- each of whom ignores the consequences of his actions on the other users. The optimality condition is given by equation (3.18). In this case P, ki, h and Lt+1 are unknown so Lt+1 cannot be estimated. If ki is close to 0 and h = 1, the value of Lt+1 is equal to the open access value. If ki = 0 and h < 1, the value of Lt+1 is greater than the open access value. If 0 < ki < 1, and h < 1, then the magnitude of Lt+1 compared to the open access model is indeterminant.

$$P\,(-S*ki*Xt + APPt) - dCi/dXi + h\,B\,Lt+1(dF/dXt) = 0 \qquad (3.18)$$

A fourth alternative generates results remarkably similar to the current situation. Suppose that Lesotho's rangeland was exploited by a livestock owner or group of livestock owners who seek to maximize current production of livestock products, regardless of costs. In that case the decision maker, or group of decision makers, would keep the number of animals at which the short-term value of marginal product from additional animals was zero. Multiplying equation (3.21) by the stocking rate generates the value of total product function, and differentiating with respect to stocking rate generates the value of marginal product function. Value of marginal product equals zero -- total product is maximized -- at the stocking rate of 0.4 animal units per hectare. This is virtually identical to the current stocking rate of 0.38 animal units per hectare. The rate of deterioration in forage productive potential would be 0.24 percent per year at the output maximizing rate.

An alternative that generates markedly different results is the case of an individual livestock owner who seeks to naximize current profits, regardless of future profits. The goal of that individual would be to keep the number of animals that would equate value of marginal product with marginal cost. This would yield a stocking rate of 0.232 animal units per hectare. This is slightly less than the rate recommended by range scientists (0.254) and would result in a rate of increase in forage productive potential of 0.24 percent per year.

In summary, the empirical analysis presented in this section supports the rejection of the common property model and doesnot support the rejection of either the open access or limited access models. The imited access model is constructed to be consistent with findings of anthropological research and is sufficiently general to incorporate the open access model as a pecial case. Complete specification of the limited access model would require information beyond that now available in Lesotho.

3.8 Evaluation of Alternative Program for Livestock Development in Lesotho

The dynamic model of rangeland ulization and tenure provides an appropriate framework for analyzing the production ad stocking rate implications of a variety of

livestock development programs that have been proposed for Lesotho. In this section the possible implications of market infrastructure developments, grazing fees or taxes, range management regulations, and grazing associations, are all analyzed using the model. A number of research needs are illuminated.

3.8.1 Market Infrastructure Development

The model of rangeland utilization and rangeland tenure is appropriate for critiquing the "marketing to transform the cattle complex" and the "marketing to meet cash needs" propositions upon which programs of market infrastructure development have been based. Presumably the development of market infrastructure has potential to increase the net producer price of livestock through improved market efficiency or lower market transactions costs. In terms of the model, a higher net producer price of livestock means an increase in P. Such an increase will have the effect of shifting up the value of average product function. This shift will have two countervailing impacts on the equilibrium stocking rate. First, livestock owners will have incentive to increase their short-term stocking rate to take advantage of the higher price with greater future marketings. In terms of the capital asset model, stocking rate increases will be accomplished by a reduction in current marketings. Second, livestock owners will have increased incentive to preserve the rangeland for future livestock production -- the user cost of current rangeland use will become higher. (This impact is not generally considered in capital asset models of livestock development.) The relative magnitudes of these two offsetting impacts will determine the overall effect on the stocking rate.

3.8.2 Grazing Fees or Taxes

The effects of a grazing fee or livestock tax are to increase the current marginal cost and simultaneously reduce the user cost of adding an additional animal to the rangeland. As with the price change, the long-term impact of the change in cost offsets the short-term impact. Livestock production and sale is less attractive in the current period -- a negative influence on the stocking rate -- and less attractive in future periods for which forage production potential is being conserved -- a positive influence on the stocking rate. Again the relative magnitudes of the two impacts determines the overall effect on the stocking rate.

3.8.3 Range Management Regulations and Grazing Associations

Previous analysts have indicated a series of problems with the implementation of the current set of range management regulations. These problems can be categorized as: (1) Problems of authority and enforcement -- chiefs have authority, but not incentive, to implement regulations on livestock owners, while government officials have incentive, but not authority. Attempts to co-opt the authority of chiefs to achieve government objectives have generally been unsuccessful and tend to aggravate those relations (Shoup 1987). There may be a tendency to overestimate the customary authority of chiefs (Lawry 1986). (2) Problems of jurisdiction and adjudication -- there is little

relationship between residential location and location of mountain rangelands. This reduces the strength of the social relations amongst users of particular mountain rangelands (Dobb 1985).

The proposition that supports the institutional framework of grazing associations is as follows: individual livestock owners should be supported in recognizing their strategic interdependence and taking that interdependence into account in collective decisions. Analysis of previous grazing associations in Lesotho suggest the following concerns for the design of future associations: (1) associations require the acceptance, if not the active support, of the customary authority structure (Shoup 1987); (2) some reallocation of grazing rights might be necessary to strengthen social support for cooperation and coordination among association members (Lawry 1986, Dobb 1985); and (3) the smaller and more well-defined the group, the more likely it is to develop successful group management of rangeland resources (Shoup 1987).

The model presented in this chapter focuses attention on three questions regarding the effects of range management regulations and grazing associations. First, how does the intervention affect agents' expectations of future access to particular areas of rangeland? This is captured by the "h" variable in the model. Security of expectations is important to rangeland conservation. Second, how does the intervention affect the number of users of any particular area? In the model this is represented by ki. The smaller the number of users the closer is individual value of marginal product to group value of marginal product. Third, how does the intervention affect the strategic interaction among agents. Agents who account for the effect of their behavior on others are more likely to adopt strategies that conserve rangeland resources.

4

VEGETABLE PRODUCTION AND MARKETING

Malijeng Ngqaleni

4.1 Introduction

4.1.1 Problem Statement

The Government of Lesotho (GOL) is actively involved in stimulating the production of vegetables in Lesotho. Since vegetables are highly valued and labour intensive crops, increased production is regarded as one way of reducing the degree of dependence on the Republic of South (RSA) with respect to employment and food imports. Lesotho imports over 80 percent of fresh fruits and vegetables from the RSA.

The GOL has initiated both large and small irrigation schemes through donor assistance. Through these efforts, the area under irrigation with emphasis on vegetable production has expanded tremendously since 1986. The area under irrigation has increased from 500 ha in 1984/85 to 2,800 ha in 1988/1989. Most of the irrigated area is currently under cereal and fodder production; the plan is to gradually bring more irrigated land under vegetable production.

With increases in local production, there have been indications of market failures when farmers have saturated their respective local markets. Lesotho farmers rely mainly on farm gate sales, with sales through retailers and wholesalers made to a limited extent. Farmers have not been able to effectively sell their vegetables through the established marketing channels serving the urban markets (Swallow and Mpemi, 1986). Marketing is therefore regarded as the major constraint hampering further increases in vegetable production.

The question is, why are farmers not able to access the formal marketing system in which wholesalers and retailers are active participants in the distribution of fresh produce? One element of an efficient marketing system is effective coordination between producers and consumers. This requires that farmers must know the requirements of their market outlets. Farmers have to know the needs of the market outlets with respect to quality and quantity, as well as the time at which the produce is required. Effective coordination also calls for an effective distribution system through which the necessary functions of transportation, grading, storage and financing can be carried out. Does the problem lie with farmers not being able to meet the requirements of the formal marketing system, and/or with the lack of necessary infrastructure and institutions to facilitate the movement of produce from farms to the market? Lack of effective coordination can therefore hamper further development in the vegetable industry in Lesotho. The identification and analysis of barriers to effective coordination

of the marketing system is therefore necessary. Given the nature of the constraints, the question is whether there is anything the GOL can do without directly being involved in the distribution of local produce to reduce these barriers such as facilitating the involvement of private entrepreneurs. Or will the GOL have to undertake other measures such as assisting local growers to undertake the marketing of their vegetables, or to directly engage in vegetable marketing?

4.1.2 Objectives of the Study

The overall purpose was to identify and analyze barriers to the development of the vegetable industry in Lesotho, and to determine possible alternative policy measures to alleviate constraining factors. The objectives were:

(i) to describe the organizational structure and operation of the Lesotho vegetable marketing system and its linkage to the RSA market,
(ii) to identify and analyze the constraints to increased production of fresh vegetables in Lesotho, and
(iii) to develop policy implications.

4.2 Structure of the Vegetable Industry

The GOL is involved in various ways in the production of vegetables. This is done with the aim of giving an impetus to the development of the fresh vegetable industry in order to attain self-sufficiency in some types of vegetables, such as cabbages, onions, tomatoes and potatoes. These vegetables are suitable for Lesotho climatic conditions, and are also widely consumed by Basotho.

Commercial vegetable production takes place on state-owned farms, projects sponsored by the GOL, or through the donor funding agencies and privately owned commercial farms. The Ministry of Agriculture (MOA), through the extension service, provides technical assistance to privately owned farms and overall supervision in all projects funded either by the government or donor agencies. The following sub-section describes the structure of Lesotho fresh vegetable industry.

4.2.1 Private Commercial Farms

Private commercial farms are those which are neither sponsored by the GOL nor by the donor agencies. There were 96 private farmers operating on 143 ha in 1985. By 1988 the number of these farmers had fallen to 56 operating on 80 ha. In 1986, 65 percent of commercial farmers had sprinkler irrigation systems. These farmers had either used their own funds to acquire irrigation systems or borrowed money from the Lesotho Agricultural Development Bank (Swallow and Mpemi, 1986, and Ngqaleni, 1989).

Most private producers are members of vegetable associations. However, most of these associations are not very active. It is only in the districts of Leribe and Berea where farmers' associations are active. The Berea Farmers' Association has managed to solicit funds for the construction of a marketing facility with cool storage in Teyateyaneng, the major urban area in Berea district.

4.2.2 Donor Funded Vegetable Projects

There are various donor agencies involved in funding irrigation projects with major emphasis on vegetable production. These projects vary widely in size and organizational structure. However, the donor funded and government funded projects have several major features in common. The exception here is the Lesotho Agricultural Production and Institutional Support (LAPIS) project which has a different structure from the rest of the projects.

The projects are usually managed by project managers appointed by the GOL, with the funding agency playing an advisory role in production and marketing. These projects involve several farmers whose fields are located near a reliable source of water. The fields are consolidated into blocks and landholders work together sharing labour, irrigation systems, and other farm machinery. The initial installation of the irrigation systems, acquisition of farm machinery and other variable inputs such as fertilizers, seeds, and chemicals are the responsibility of the funding agency. Farmers primarily work as laborers under the supervision of the project staff. In some cases, farmers are paid as laborers, while in some instances they only share the proceeds from the sale of vegetables. These projects are normally funded for a period of 5 to 10 years. After this period, farmers acquire capital invested in these schemes, and they are responsible for the supply of variable inputs and necessary replacement of equipment. These projects are shown in Table 4.1. According to the 1987/88 figures, the donor funded projects covered a total of 163 ha under irrigation, and 76 ha were put under vegetable production.

The LAPIS project operates quite differently from the rest of the donor funded projects. It has three facets including support for the research division of the MOA, teaching at the Lesotho Agricultural College, and livestock and vegetable production. With respect to vegetable production, LAPIS has funded 34 small individual farmers producing on a total of 24 ha. Under the LAPIS project, farmers work on their own individual fields. The size of landholding per farmer under the LAPIS project ranges from 0.20 ha to 1.85 ha, which is relatively small compared with other projects. The assistance given by LAPIS is not a grant, as with other projects. Farmers are given loans in the form of irrigation equipment and variable inputs at the initial stage of production. The latter variable inputs includes fertilizers, seeds, and chemicals. Thereafter a farmer is responsible for the payment of the loan and the purchase of variable inputs (LAPIS project, 1988). Farmers are given a very close supervision during production by the District Production Officers who are part of the LAPIS project staff located in the districts. The technical advisors from the LAPIS head office in

Table 4.1 The Donor and Government Funded Projects; Total Area Under Irrigation and Areas in Vegetable Production, in Hectares, 1987/88

		New Irrigation Projects			Other Projects			State Irrigation
District	Project Name	Total Irrig. Area	Area in Veg. Prod.	No. of Farmers	Total Irrig. Area	Area in Veg. Prod.	No. of Farmers	Total Area
Butha-Buthe	Hololo Valley							
	Rasekila				9	5	10	
	Phohloane				9	4	13	
	Khukhune				2	2	3	
Leribe	Tsikoane	440	33	310				
	Peka	217	23					
	Hlotse	141	16					
	Maputsoe	107	14					
	Leshoele	10	7					
	Thaba-Phatsoa				50	22	68	
Berea	Phuthiatsana							
	Lebina				30	23		
	Majaheng				19	3		
	Mapoteng				14	3	11	
Maseru	Mazenod	215	36					
	Mejametalana							20
Mafeteng	Tsalitlama							22
	TsaKholo				15	10		
	Ha Thoahlane	233	10					
	Litsoeneng	352	20					
MHoek	Maphutseng	120	15					
	Makhaleng	126	15					
Quthing	Seaka	400	60	62				
	Tele	105	32					
Qacha's Nek	Ha Noosi				15	4	10	
Total		2466	281		163	76		42

Source: Department of Marketing and Economics, and Crops Division, Ministry of Agriculture, 1988.

Maseru visit the farm sites regularly to provide technical assistance.

The GOL owns two state farms. These are Mejametalana and Tsalitlama, which produce vegetables on 20 ha and 22 ha, respectively.

4.2.3 The New Irrigation Projects

The GOL has also funded large scale irrigation schemes, often known as the New Irrigation Projects (NIP). The GOL initiated these projects with the aim of achieving its objective of self-sufficiency in staple vegetables by 1990/91. Four of these projects started operating in 1987/88, and others are due to begin production during the 1988/89 production year. Table 4.1 presents the area covered, number of farmers (where they are known) and the location of the projects.

The NIP projects cover a total area of 2,466 ha under irrigation. However, only 281 ha was under vegetable production during the 1988/89 production year. The produce from these projects is expected to replace imports which are mostly consumed in the urban areas.

4.2.4 Vegetable Production and Self-Sufficiency

The total area under irrigation during the 1988/89 production year was approximately 2,800 ha (Ngqaleni, 1989). While the NIP made up 88 percent of the total irrigated land, only 12 percent of the total irrigated area covered by the NIP was put under vegetable production in 1988/89. However, the GOL hopes that gradually more of this land will be drawn into production as farmers become more familiar with vegetable production and as the marketing system for local produce becomes better organized.

According to the estimates by Ngqaleni (1989), Lesotho is capable of reaching 93 percent self-sufficiency in production of cabbage, potatoes, onions and tomatoes with only 39 percent of the land under irrigation utilized for vegetable production. This shows that if Lesotho can bring half of the irrigated land under vegetable production, there will be a surplus in the production of these crops.

4.2.5 Vegetable Imports

Lesotho primarily relies on imports from the RSA for most of its fresh vegetable and fruit requirements. In 1985, approximately 28,000 tonnes of fresh vegetables were imported from the RSA. These imports represented 2.3 percent of the 1,396,300 tonnes of vegetables sold in the RSA fresh produce markets; however, it accounted for approximately 60 percent of the fresh vegetables consumed in Lesotho.

Imports from the RSA come from any of the fourteen fresh produce markets, or directly from the farms. Of the fourteen national fresh produce markets, Lesotho traders normally purchase from Johannesburg which is approximately 455 km from Maseru, 500 km from Pretoria and 160 km from Bloemfontein.

4.2.6 Structure of Vegetable Distribution and the Role of the MOA

The wholesale and retail traders primarily handle the distribution of fresh vegetables consumed in Lesotho. There are two major types of traders involved in the wholesaling of fresh produce in Lesotho. They are general wholesalers and fruit and vegetable specialists. These traders primarily handle produce imported from the RSA.

The MOA, through the Department of Economics and Marketing, has the responsibility of formulating policies which will lead to the development of an appropriate system of marketing local vegetables. Through the Marketing Section, the department is supposed to play a regulatory role in the marketing of vegetables. Currently, the only government regulation regarding vegetables relates to imports. Through the District Agricultural Offices, import permits are issued to traders on request. The purpose is to regulate imports of vegetables so as to restrict them when local produce is available. However, under the South African Customs Union agreement, of which Lesotho is a signatory member, effective trade restrictions cannot be imposed without the agreement of all members of the Union. To date, the Lesotho government has not been able to negotiate successfully for control over vegetable imports from the RSA. The argument against restricting RSA imports is that in the future Lesotho might need unrestricted access to the RSA markets.

The Marketing Section of the MOA initiated a vegetable market information programme in 1985. Through this programme, prices from the Pretoria, Johannesburg and Bloemfontein fresh produce markets are telexed daily to Lesotho. Local traders' prices were collected twice a day in major urban markets, and data relating to local production was to be collected periodically. The objective was to disseminate this information to farmers and traders by radio, and to use this information as an input in policy formulation. However, the Marketing Section has not been able to implement effectively the programme because of lack of supporting staff, especially at the district level. Therefore, the radio broadcasts have been on an infrequent basis. Neither the Extension Division nor the Department of Economics and Marketing has field staff responsible for the marketing of fresh produce and collection of market data.

LAPIS is the only project which has included a marketing extension program. This project is trying to adopt a long-term strategy which will alleviate the marketing problems of farmers even after the project has phased out. By contrast, other projects have often resorted to only short-term assistance, like using government vehicles to transport produce, which will not be available once the project has terminated.

The LAPIS project has identified lack of transport as the major source of marketing problems of surplus produce from local farms. The project is setting up a strategy which addresses this problem, especially with regard to small individual producers. This program is based on the understanding that small farmers cannot afford to purchase their own trucks because of the high fixed costs relative to their potential usage.

The LAPIS strategy is to encourage farmers to operate weekly produce deliveries to neighboring villages based on existing commercial trading in the area. This requires that the truck should be available at specified days of each week. A schedule is worked out between farmers and the interested truck owners for picking up produce at the farm sites for distribution in the villages. The initial target for this program is the distribution of surpluses in the neighboring villages. LAPIS has realized the potential for expanding those markets since there is much less fresh produce from the RSA flowing into these villages than in the urban markets. However, these villages are far from the production sites (LAPIS project, 1988).

At present, the plan is to leave this transport service in the hands of private entrepreneurs. This will reduce the need for farmers to acquire their own vehicles for transporting vegetables. LAPIS is trying to create an environment through which private truck owners will have an incentive to undertake transport service. LAPIS is doing this by developing a network of village markets through which trucks will be hired to deliver to the villages on certain days. A network of village vendors is to be an essential part of this strategy. Since these vendors do not currently exist in most areas, local people will have to be encouraged to undertake this operation. Vendors will be selling directly to the households. Farmers are to be involved in the negotiations for transport with the truck owners under the assistance of LAPIS marketing officers. At the beginning of the programme, LAPIS will absorb any losses due to spoilage incurred because of oversupply to any village. It is hoped that after the program has been in place for sometime, it will be easier to estimate demand, and incorporate this information in planning production and marketing (LAPIS project, 1988).

LAPIS is also giving farmers courses on marketing, in which cleanliness, grading, packaging, and timeliness in fulfilling orders are emphasized. All these efforts are considered to be part of the ongoing education program for farmers, and indirectly for potential private entrepreneurs who can provide the required marketing services. The LAPIS approach is thus an example of forward vertical integration where farmers are instrumental in developing markets.

4.3 Methodology

4.3.1 Analytic Model

The industrial organization theory which centres around the structure-conduct-performance (S-C-P) paradigm has been adopted as a tool of analysis. The S-C-P paradigm suggests that there is a predictable relationship between the structure of the industry, the conduct (behaviour) of firms within the industry, and the performance of the firms (Scherer, 1980).

This model has been widely used in the analysis of the relationship of firms within a particular industry or market, that is, at the horizontal level of the marketing

system. This entails an analysis of the market structure in order to determine the competitive relationships, which range from pure competition to pure monopolist market structures. The structural dimensions which have been given greater attention include the degree of seller or buyer concentration, the degree of product differentiation, the condition of entry and exit, and vertical integration. The structure of the market is expected to influence the behaviour of firms, in determining prices, output and selling strategies. The market conduct is supposed to influence the performance of the market. The performance criteria include efficiency in the employment of resource, progressiveness in enlarging and improving goods and services, and stability of prices. The analysis of horizontal structure would therefore attempt to find an empirical relationship between market structure, conduct and performance. Profits and marketing margins are commonly used as performance indicators.

However, in this chapter the focus is on understanding the vertical market relationship within the Lesotho fresh vegetable industry. The S-C-P paradigm is primarily used as a conceptual guide to vertical system analysis rather than for a specific model testing. Figure 4.1 shows the S-C-P paradigm adapted for the analysis of the vertical market relationship. This model indicates that the basic market conditions constitute the decision environment in which firms consider the alternatives they have in order to meet their goals. This in turn influences the conduct or behaviour of firms, with particular emphasis on how they relate with other firms in the subsequent stages along the vertical continuum. The description of the vertical market interrelationship is given as part of the structure and conduct components of the S-C-P paradigm. The performance is evaluated with respect to the assessment of some aspects of coordination between the market levels.

4.3.2 Approach to the Study

The source of data for this analysis was a survey administered to the selected farmers, wholesalers and retailers. A sample of 40 farmers, 11 wholesalers and 40 retailers was drawn from six lowlands districts of Lesotho, Butha-Buthe, Leribe, Berea, Maseru, Mafeteng and Mohales' Hoek. These districts were selected out of the ten districts of Lesotho because they are the major vegetable producing areas, and are more suitable for vegetable production because of the longer growing season and good arable land. Vegetable imports in each of these districts have also been higher than in the other four districts.

Four major types of fresh vegetables (cabbage, potatoes, onions and tomatoes) were selected for this analysis. These were selected because they have been identified as the major vegetables produced and consumed in Lesotho. Wyeth and Moletsane (1983) indicated that these four vegetables made up to 80 percent of the total fresh produce imports in 1983. In volume terms the proportion of cabbage should be considerably higher since the value of cabbage per kilogram is much lower than the other three. These vegetables could, therefore, be regarded as representative of the

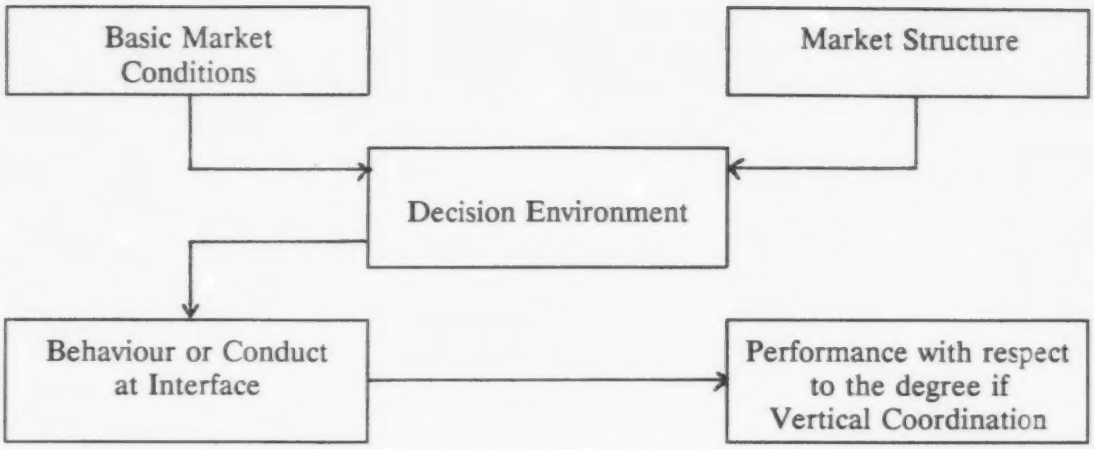
Basic Market Conditions
Market Structure
Decision Environment
Behaviour or Conduct at Interface
Performance with respect to the degree if Vertical Coordination

Figure 4.1 A Model of Industrial Organization Adapted for the Analysis of Vertical Market Relationships.

fresh produce industry in Lesotho. This is important because the current study is not necessarily commodity - specific; its aim is to understand the problems constraining further development of the fresh produce industry in Lesotho.

Three separate, but related sets of questionnaires were designed for each of the market levels under study. The three market levels are farmers, wholesalers and retailers. Questions were organized around two major themes of inquiry. The first part of the questionnaire sought descriptive information of the vegetable marketing system. The second part dealt with information relating to vertical coordination. This involved an application of Purcell's (1979) idea of "mirror - image" questioning. The "mirror-image" questioning procedure entailed asking similar questions to the three market levels. This method of questioning facilitates the isolation or identification of inter-level operational conflicts and inconsistencies between the identified market levels. By employing "mirror - image" questioning procedure, the decision centres at each stage of the marketing system had an opportunity of responding to similar questions from their own perspective as buyers or sellers.

Non-parametric procedures were used for the analysis of the survey data. Among the non-parametric procedures, the Kendell's tau and Kendell's coefficient of concordance were used to compute a measure of strength of relationship between variables. Whereas Kendell's tau measures correlation between two variables, Kendell coefficient of concordance measures the degree of association among three or more variables. These measures of association require that variables be measured at least on an ordinal scale. The frequent use of ranks in the survey questionnaire is the major reason for the choice of these measures of association. They were used in interpretation of the mirror-image questions.

4.4 Results and Analysis

This section presents an analysis of the survey results. The first part describes the operational procedure of each of the market levels. The second part presents the analysis of the nature of constraints to increased production of vegetables in Lesotho. Both production and marketing constraints are discussed.

4.4.1 Operational Characteristics of the Vertical Market

Farm Level

The local farmers utilize three types of market outlets: consumers, retailers and wholesalers. Table 4.2 indicates the proportions sold to each market outlet by local farmers. It shows that direct sale to consumers is the most utilized market outlet.

Table 4.2 Proportion of Vegetables Marketed Through Consumers, Retailers, and Wholesalers

	Weights
Consumers	0.79
Retailers	0.27
Wholesalers	0.17

Source: Farmers' Survey, December, 1988.

According to the survey, farmers rely heavily on farmgate sales. Seventy two percent of the sales took place at farm sites. Since farmers mostly sell to consumers, it means they rely on consumers from their respective local areas to purchase produce from the farms. Farmers sometimes deliver to consumers in the neighbouring villages using scotchcarts, and a few use vans and tractors[1]. Direct sale to consumers does not require any grading and packaging, and sales are made in small unpackaged lots. Since direct sales to consumers is the most important market outlet for farmers, this implies that most of the time produce is sold in small quantities in an ungraded and unpackaged form.

[1]A scotchcart is an animal drawn cart.

However, when farmers deal with traders, certain marketing services to link producers and consumers are necessary. Either traders or farmers have to take responsibility for providing these functions. When farmers were asked to indicate the marketing services they provide, 28 percent transported vegetables to the market, 40 percent did some packaging and cleaning before selling, 38 percent graded some vegetables, and 2 percent provided storage. It should be noted that only a few projects have storage facilities; individual producers do not even have sheds where produce can be conveniently graded and packaged.

Wholesale Level

According to the survey, wholesalers of vegetables in Lesotho primarily rely on the RSA market for supplies of fresh produce. Purchases made from the RSA fresh produce markets constitute approximately 62 percent, 75 percent, 86 percent and 86 percent of cabbage, potatoes, tomatoes and onions, respectively (Table 4.3).

Table 4.3 Wholesalers, Sources of Vegetable Supply

Type of Vegetable	Percent of Quantities Purchased		
	RSA Markets	RSA Farms	Lesotho Farms
Cabbage	62	19	19
Potatoes	75	19	6
Onions	86	14	-
Tomatoes	86	14	-

Source: Wholesalers' Survey, December, 1988.

Direct purchases from RSA farms are made less frequently. Wholesalers' purchases from RSA farmers were as follows: cabbages and potatoes made up 19 percent, onions and tomatoes 14 percent. Local farmers are the least important source of supply. Wholesalers bought about 19 percent of cabbage and 6 percent of their potatoes from local farmers. The limited purchases from Lesotho farmers shows the importance of RSA fresh produce as a source of supply for the Lesotho market. Only 18 percent of the respondents produced some vegetables for the Lesotho market.

Although 60 percent of the wholesalers who sometimes bought from the farmers provided transport, they stated that it is very costly because farmers are geographically scattered with limited quantities of one or two types of vegetables. When asked to indicate who is best equipped to provide marketing functions (transportation, grading, and packaging) for local produce, wholesalers stated that grading and packaging should be done by farmers. The wholesalers claimed they would be willing to provide transport if the produce were already assembled from various farmers.

The market outlets for wholesalers are street vendors, other small retailers, and consumers. According to the survey, street vendors are the most important outlet for wholesalers, accounting for over 70 percent of their sales.

Retail Level

Retailers of fresh produce in Lesotho have four sources of vegetable supply: local wholesalers, RSA fresh produce markets, RSA farms and local farms (Table 4.4). Local wholesalers are the most important supply source. Quantities of cabbage, potatoes, onions and tomatoes bought from wholesalers constitute approximately 60 percent, 63 percent, 66 percent and [illegible] percent of quantities handled by surveyed retailers. Large retailers such as general dealers mostly get their produce directly from the RSA. Most of them are chain stores which get supplies through their head offices in the RSA.

Lesotho farmers, especially those in projects, transport produce in an unpackaged form to street vendors. Retailers indicated that 62 percent of the time produce was delivered to them by the farmers. Of the retailers who were interviewed, 52 percent have taken part in the cleaning and packaging of vegetables they bought from local farmers, 28 percent have taken part in sorting (grading) of the produce, and 38 percent have arranged for transportation (mainly using public transport).

Table 4.4 Vegetable Sources for Retail Traders

Type	Percentage of Quantities Purchased			
	Local W[1]	RSA Markets	RSA Farms	Lesotho Farms
Cabbage	60	14	03	23
Potatoes	63	16	-	21
Onions	66	10	-	24
Tomatoes	64	11	-	25

[1] Wholesaler

Source: Retailers' Survey, December, 1988.

4.4.2 Constraints to Increased Vegetable Production

Farmers were asked to indicate the constraints to increased vegetable production. They were first asked whether the constraints were directly related to production or marketing. In the survey, farmers gave marketing related constraints more weight (0.64) compared with those related to production (0.36). This section describes

the nature of production and marketing related problems encountered by vegetable farmers and traders in Lesotho.

Production Related Constraints

Farmers were asked to rank possible production related constraints as indicated in Table 4.5. Difficulty in crop management compared with other crops and availability of variable inputs were given equal weights.

Table 4.5 Production Related Problems Encountered by Farmers

	Weights	Ranks
(a) Difficulty in crop management compared with other crops such as maize and wheat	0.53	1.5
(b) Availability of variable inputs (such as purchased labour, fertilizers)	0.53	1.5
(c) Lack of property rights	0.50	2
(d) Availability of other fixed inputs (such as irrigation systems, tractors)	0.37	3

Source: Farmers' Survey, December, 1988.

Vegetable production requires good management decisions regarding when to irrigate, and when to control pests, diseases and weeds. If irrigation is not well-scheduled to provide crops with adequate water, the farmer will not have a good crop. This is one of the factors which can adversely affect the quality of the product. Timely and adequate control of pests, diseases and weeds also partly determines the quality of the product. The market places high premium on vegetables free of pests and diseases. Therefore, the quality of vegetables highly depends on the management skills of the farmer and on the availability of inputs such as chemicals to control insects and pests. If farmers have problems in proper management of their crops, either financial or managerial, this could hamper their capability to access the wholesale and retail markets as they will not be meeting their quality requirements.

LAPIS project staff also mentioned failure to control quality as one of the main management problems of farmers in the project (MOA, 1988). According to LAPIS, sometimes farmers fail to follow the recommended insect and disease control program, and fail to irrigate on schedule. At times farmers delay planting/transplanting and harvesting because of failure to hire sufficient labour to undertake these tasks. It is, however, important to find reasons for these stated management problems. These could be problems encountered by most commercial vegetable producers in Lesotho. It could possibly be due to a lack of appropriate management skills or lack of working capital

to maintain adequate supplies of variable inputs, such as insecticides, labour and herbicides. If the problem is management, farmers would need more training and information to improve their farm management practices. On the other hand, if it is a lack of working capital there will be a need for easily accessible short-term loans for farmers.

Lack of land rights was mentioned as another constraint to increased production. This is particularly the case with the individual producers and the LAPIS farmers who have sprinkler irrigation systems on very small acreages. Some of these farmers would be willing to exchange their fields far from the sources of water with neighbouring farmers not interested in vegetable production, or to enter into lease arrangements.

Marketing Related Problems

With respect to the nature of the marketing problems encountered by farmers, the top-ranked was the risk of not being able to find a market for the product (Table 4.6). Easy access to the market is very important for a vegetable producer since once vegetables are harvested or are ready for harvesting, they deteriorate rapidly. Local farmers indicated that they are always very uncertain as to whether they will get large buyers so as to dispose of the product quickly prior to incurring losses. Some farmers have indicated that they have had vegetables perish in the fields because of the lack of a market. They also stated that wholesalers offered very low prices which would hardly cover their costs of production.

Table 4.6 Marketing Problems Encountered by Farmers

	Weights	Ranks
(a) Uncertainty of market prices for vegetables compared with other crops such as maize	0.28	5
(b) Risk of not being able to find a market for vegetables	0.83	1
(c) Lack of understanding of marketing procedures such as grading and packaging	0.29	4
(d) Lack of transportation	0.79	2
(e) Lack of information on market prices	0.21	6
(f) Lack of storage	0.74	3

Source: Farmers' Survey, December, 1988

Lack of transport was ranked second, and it was also assigned a high weight (0.79). For a farmer who does not have reliable transport, the risk of not being able to find a market for his produce is relatively high. With reliable transport, farmers

could deliver to consumers in distant villages and to small retailers. This would minimize the losses even though this would increase the costs of search and time spent which would otherwise be spent in production. All these factors give rise to more reliance on farmgate sales, which require planting in small quantities to avoid losses. Therefore, the lack of transport limits the farmer in assuring a market for his product.

Lack of storage facilities was ranked third highest (0.74). Farmers lack facilities in which to keep their produce during harvest for sorting and packaging. This further intensifies post-harvest losses. Lack of such facilities implies that a farmer will be exposing his produce to the sun instead of keeping it shaded and moist during harvest. This deteriorates the quality, which may have been good, and may result in rejection or great discount in the market.

Ranked fourth was lack of understanding of marketing procedures, such as grading and packaging. Farmers did not attach much importance to grading as a constraint, which could be attributed to their reliance on farmgate sales and vendors. Alternatively, it could indicate that farmers are not aware that they do not grade properly whenever they sell to the large traders who expect their produce to match RSA standards. When asked how they determine the quality of potatoes, tomatoes and onions, 54 percent claimed to have used RSA grades as required by local traders, while 46 percent did not use any standard grades.

Farmers indicated a problem in obtaining packaging materials. The nearby input stores do not sell packaging materials; farmers have access to them only through the projects or from the RSA. Wholesalers have indicated that sometimes they had to provide their own packaging materials.

Though prices of fresh produce are volatile, farmers put less emphasis on uncertainty of market prices and lack of timely price information. This could also be attributed to the idea that farmers do not yet fully participate in the formal marketing system. Alternatively, it may indicate a lack of market intelligence which gives rise to a lack of appreciation of the value of market information in decision-making[2].

The question on the nature of the marketing constraints in the distribution of local produce was directed to the three market levels. The following possible constraints were to be ranked: (i) lack of information on product availability; (ii) costs of assembly are too high; (iii) lack of grading and packaging; and (iv) no consistent supply (Table 4.7). The Kendell's coefficient of concordance was used to test the hypothesis of no correlation in the rankings of the three market levels. The specific hypothesis was:

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[2]Market intelligence refers to the ability to analyze market data and to determine what it means with respect to the decisions that have to be made (Schermerhorn, 1986). That is, market data has to be translated into information that forms a basis for decision-making.

H_o: the three sets of rankings are not associated.
H_1: there is significant agreement amongst the three groups regarding factors constraining the distribution of local produce.

The hypothesis was rejected with 95 percent confidence. This suggests that there was consensus among farmers, retailers and wholesalers regarding the major constraining factors in the marketing of local produce. The following is the ranking order by three

Table 4.7 Factors Constraining Increased Reliance on Local Produce

	Farmers		Wholesalers		Retailers	
	Wght[1]	Rank	Wght	Rank	Wght	Rank
(a) Lack of information on product availability	0.59	3	0.50	4	0.53	3.5
(b) Costs of assembly are too high	0.85	1	0.64	2	0.66	2
(c) Lack of grading standards	0.44	4	0.59	3	0.53	3.5
(d) No consistent supply	0.71	2	0.84	1	0.79	1

Note: wght stands for weight.
Source: Survey, December, 1988.

market levels: (i) no consistent supply; (ii) costs of assembly are too high; (iii) and lack of information and lack of grading were equally ranked.

Wholesalers indicated that local production is very sporadic and limited when available, and they are always regarded as residual claimants of what farmers could not sell through consumers and retailers. The produce often reaches them in an unsatisfactory condition. Moreover, farmers often fail to meet the delivery contracts. Farmers fail to deliver, harvest and package produce at agreed times. This problem was mentioned by traders and the LAPIS project at the workshop organized by the MOA (May, 1988). These factors, therefore, lead to a perceived lack of reliability in the flow of produce from local farms. This results in high transaction costs in terms of the riskiness involved when relying on local farmers, and the continued reliance of traders on the RSA markets. Wholesalers also felt that the costs of assembly for local produce were too high relative to the cost of transport from their regular sources of supply in the RSA. Furthermore, wholesalers argued that farmers expect prices which are too high relative to the costs they incur to purchase their produce. Wholesalers have also indicated that farmers do not understand that prices of vegetables fluctuates periodically. They are always expecting high prices and yet traders are constantly

watching RSA prices in their decision-making process. This also complicates the process of price discovery when dealing with farmers. This suggests that farmers lack a general understanding of market forces and pricing and that they do not have adequate information in order to develop price expectations. Wholesalers ranked lack of grading third. Although grading is important to traders, they attached more importance to getting dependable supplies at low prices.

Wholesalers did not regard lack of information on product availability as being a problem. This is likely because they rely on alternative sources of supply and because of their requirement for local farmers to inform them and to bring samples prior to any purchase decisions. However, wholesalers mentioned that sometimes farmers select good quality samples which are not representative of the produce available at the farm. When they go to pick up the produce, they find most of it to be of unmarketable quality. If this is the case, the procedure of requiring a sample is of little value and does not assist in the negotiating process.

Retailers were less concerned about the quality of the produce from local farmers. In fact, retailers indicated their preference for local produce since it is usually freshly harvested as compared with RSA produce which often goes through many stages of the marketing system before it reaches them. They also mentioned lack of consistency in supply as the major constraint to buying from local suppliers. Costs of assembly were ranked second. These traders usually buy in small quantities which do not require individual ownership of a vehicle.

Farmers are aware that their supplies are limited and sporadic relative to the consistent requirements of traders. But the uncertainty of whether traders will buy their produce when it is available in large quantities still makes them reluctant to produce more to meet wholesalers' requirements. This is intensified by the lack of reliable transport, which was ranked first by farmers as a constraint (Table 4.7). There appears to be a lack of economic incentive for farmers to meet consistency in quantities required by traders because they are not certain that they will be rewarded. It seems prices they received from traders (even though there was no data on prices) have not given them the incentive to produce more. On the other hand, farmers appear to fail to attach much importance to the traders' needs with respect to timeliness in the delivery of vegetables. They, therefore sometimes fail to honour the agreements on delivery or timely harvesting as indicated by LAPIS and traders.

4.5 Conclusion

According to the preceding analysis, it seems the current formal marketing system for fresh vegetables in Lesotho operates well to serve the needs of traders and consumers, but it does not meet the needs of farmers. It is therefore concluded that there is a lack of coordination between farmers and traders. Lesotho has not been able to develop its own internal marketing system for fresh vegetables to integrate producers

with consumers. The well-functioning marketing system in the RSA is merely extended into Lesotho through local wholesalers and retailers.

In Lesotho, it seems there is a lack of an effective support system, an efficient market infrastructure, and regulatory and incentive program to encourage the development of the marketing system. The specific support services which are necessary for efficient and effective operation of the marketing system include extension, market information, market regulation and financing. The current extension program of the MOA focuses mainly on the production aspect of vegetables. However, it is still questionable as to whether it has been effective in imparting management skills to farmers. The extension service of the MOA, with the exception of the LAPIS project does not include the marketing aspect of fresh produce. Farmers could therefore be ignorant of how they could effectively participate in the formal marketing system. Farmers need to know and understand the need for grading and standardization, packaging and appropriate pricing procedures. This calls for extension program through which all commercial vegetable producers could get training and information on how they can best sell their vegetables beyond the farm gate level.

Lesotho does not have any regulation procedures for local produce primarily because there are no formal standards of quality control that have been developed for local produce. Grades and standards are necessary to facilitate communication and exchange between market participants since they increase information regarding the quality of the product under consideration.

Other than easily accessible short-term credit, financial assistance is also required if farmers are to acquire the necessary infrastructure for the distribution of their produce. Currently the GOL gives farmers financial assistance through the development projects for the establishment of irrigation schemes. However, there is currently no financial assistance for the acquisition of the necessary marketing infrastructure. The major marketing problems faced by farmers are the lack of transport followed by lack of adequate storage facilities, as well as lack of marketing premises.

4.6 Policy Implications

Production and distribution of local produce is evolving. It is evolving from a stage involving direct producer-consumer exchange of the product in the neighbourhood to a stage where producers have to access distant consumers. This comes as a direct initiative of the GOL through the large scale projects whose purpose it is to reduce imports from the RSA. Increased production from the projects (such as NIP) is expected within a very short time. Thus it seems that the LAPIS approach whereby the private sector is being encouraged to become involved in vegetable marketing, will not be suitable to alleviate the problems encountered by farmers in large irrigation projects. These projects need large buyers who will assemble the produce in large quantities for the urban markets. Since there is little processing in Lesotho, the potential buyers are

local wholesalers. It is, however, very unlikely that wholesalers can provide the necessary functions to transfer produce from the farms in order to provide necessary stimulus for the local marketing system to evolve. This is because wholesalers find the produce from local sources to be costly and of inferior quality and quantity compared with that from the RSA.

Lesotho farmers are also unable to provide local traders with a full line of fresh produce requirements since production is seasonal and limited to temperate zone crops. That means wholesalers would still have to buy some produce from the RSA, even if they could develop a strategy of buying from local farmers. This may not save the wholesalers transportation costs. The possibility of economic incentive is one of the factors that can lead to the willingness of firms to coordinate their activities. That is, if wholesalers were assured of reduced costs and increased profits by changing their sources of supply, they would not hesitate to do so.

On the other hand, the market environment faced by farmers is very uncertain. The main problem mentioned by farmers is lack of guarantee of market access. It would seem this does not give them an incentive to produce and probably to incur more costs to improve the quality of their produce. It would appear to be very risky for farmers to increase production and incur more costs because of the high possibility of not being able to find a market, and of selling at very low prices which do not cover the costs of production. They appear to be caught in a squeeze between production costs and marketing costs.

Even though it may be uneconomical for wholesalers to take an active role in the development of the distribution system for local produce, it would make economic sense for farmers and/or the GOL to undertake this task. An orderly marketing system would result in benefits for the Basotho society because of the externality effect improved marketing would have. The benefits include improvement in the welfare of farmers with respect to increased incomes. This would further encourage increased production and employment in the rural areas which is in line with the GOL objective of reduced dependence on the RSA.

Since the wholesalers are not likely to assume the required marketing functions for local production, the initiatives for improving marketing services should come from the farm level and the GOL. The question is, what is the nature of the system that can be developed through which local farmers are linked with the urban market? What role can the GOL play in order to facilitate the development of such a system?

Previous studies have suggested ways of improving the marketing system for local produce. These include the establishment of national/central markets owned and operated by the GOL (Savage, 1985, and Hunt, 1987) and collective farmers' marketing (Ngqaleni, 1989). Both of these methods seem to offer a potential solution, given the nature of the problems encountered by farmers and traders in the distribution of local produce. The potential benefits and disadvantages were analyzed by Ngqaleni (1989).

However, one cannot offer conclusive evidence at this stage as to which would be the best method to be adopted since the specific costs of the alternatives have not yet been analyzed. It is clear from the analysis that the GOL has to play an effective role in the development of the marketing system for fresh produce in Lesotho. This is because farmers lack finance and proper marketing skills to effectively undertake the required marketing functions without assistance from the government. It is, therefore, important to carry out a comparative cost analysis on both methods in order to determine the best marketing system to be adopted by Lesotho.

5

DAIRY PRODUCTION, MARKETING AND TRADE

Motsamai Mochebelele

5.1 Introduction

5.1.1 The Problem Situation

Dairy development features prominently amongst potential livestock enterprises which Lesotho attempts to promote. It is perhaps one of the enterprises which are least developed even though the potential for development and growth is large. A number of obstacles which stymie its development should yet be overcome and make way for improvements. Contrary to the extensive grazing methods characteristic of the general livestock sector, significant changes which favour a zero-grazing intensive system have been witnessed in the 1980s. Zero-grazing has been adopted for feeder cattle through the government owned abattoir and feedlot complex. This practice is also becoming increasingly popular amongst dairy farmers. Further expansion of dairy farming throughout the country should help to ease overgrazing of the range.

Should the dairy industry's potential be fully exploited, a number of positive developments are expected to emerge. The most important question will be how dairy farming can best be integrated meaningfully into the broad livestock system. The government policy has been forged such that farmers are encouraged to sell two to three cattle from their indigenous herd and from the proceeds purchase one exotic dairy breed. This forms the most important and basic premise through which attempts are made to meaningfully integrate dairy farming with the general livestock system. Through the multiplier effects, the national herd size and composition is liable to change for the better. The successes and failures of this approach may not be very obvious in the absence of hard data, but positive results are already emerging.

The development of formal marketing channels for local milk production is a recent occurrence in Lesotho. This was marked by the construction of a processing plant which became the first major symbol of attempts to modernize dairy farming in the country. The plant has since been expanded in response to the growing use of the formal milk marketing channel. The plant now has a daily processing capacity of 10,000 litres compared to 1,500 litres of the previous plant.

In contrast to the young dairy industry in Lesotho, the South African dairy industry has a long history. The RSA companies have serviced the local markets with milk and milk products on a laissez-faire basis. They marketed through formal marketing outlets, namely retail stores and supermarkets with deliveries normally based on prearranged fixed orders. The South African dairy companies also marketed through

less formal outlets directly to institutions like hospitals, schools and hotels. Normally, these sales involved bulk unprocessed milk. Through informal and marketing channels, sales were also made to individual consumers directly from the delivery trucks.

Due to the predominantly laissez-faire marketing system in Lesotho and the underdeveloped local dairy system, the RSA companies dominated the markets for milk and dairy products in Lesotho. The question then was, how best could the growing local dairy system compete favourably against the well-established foreign companies. The study was undertaken to focus on the search for and evaluation of alternative production, marketing and trade options available to Lesotho.

The analysis starts from the premise that production and marketing are highly inter-linked in the dairy industry. That is, the evolution of a sound production base is highly dependent upon the structure of the marketing system in place, government policies and regulations. The structure of the marketing system was, by virtue of the massive participation of foreign companies, dependent on the RSA pricing and trade policies. In many ways, the dairy system in Lesotho was virtually an extended market of the RSA. But the picture changed significantly in 1989 when access to Lesotho dairy markets by RSA companies was first controlled.

The expansion of the local production base has a bearing on the market share of the foreign companies. Similarly, the role of the foreign companies has a bearing on the expansion of the local milk production via the market linkages. The latter was the primary focus of the study in support of an inward looking policy strategy.

5.1.2 The Purpose and Objectives of the Study

The overall purpose of the study was to examine alternative economic and trade policies which have a bearing on Lesotho's dairy development. On the basis of the established alternative policies, evaluation of respective implications on a number of variables was made. The variables against which impacts were measured are : consumer and producer prices, market shares between the local milk produce and foreign companies, and trade flows to different market areas.

The specific objectives of the study were:

1) to make an exposition of the dairy sub-sector's development performance in Lesotho,

2) to develop an analytic model for use in the examination of the differential impacts of alternative trade policies with regard to milk production, pricing, distribution and trade, and

3) to examine the potential effects of simulated alternative sets of trade policies on trade flows, consumption, processing, pricing, producers,

consumers and the industry's welfare.

5.1.3 The Scope and Outline

The dairy sub-sector in Lesotho is characterized by two major forms of markets, namely informal and formal marketing channels. The common feature of the informal marketing system is the direct producer-consumer transactions which involve raw unprocessed milk from the farm. The formal marketing system has middlemen, some of whom process and package the product as well as market it through formal marketing outlets and to a lesser extent, directly to the consumer. Of the two markets, the study focused on the formal system. That is, direct trade of milk between the consumer and the producer and the on-farm domestic consumption of milk was not brought into the formal analysis.

Of the vast geographic features of the country, only the Lowlands were included in the study. The distinct areas of the study comprised the six administrative districts of Butha-Buthe, Leribe, Berea, Maseru, Mafeteng and Mohale's Hoek. These districts have a better developed commodity trade system which includes milk and milk products functioning on a formal commercial basis.

For the purpose of a detailed analysis, a spatial equilibrium model was developed. The model is of a type advanced by Samuelson (1952) and later modified in order to be solved using a simplex method. The works by Cappi et al. (1978), and by Duloy and Norton (1983) were an outcome of the modified version based on the simplex method which derives optimal trade patterns between the supply and demand regions. The simplex formulation was adopted for a model employed in this study.

5.2 Structure of the Dairy Industry in Lesotho

5.2.1 Dairy Cattle in Lesotho

Most African countries experienced some form of intensive farming since the advent of the colonial era. Intensive dairy farming was introduced in Africa based on grade cattle brought by settlers. In general, the settlers established large dairy farms and feeder ranches which still exist in the RSA and the now independent African states like Zimbabwe and Kenya. Lesotho, however, did not share similar experiences during its colonial days. Despite the conducive temperate climate and altitude, dairy farming did not evolve. Rather, Lesotho became a natural market for the South African settler farmers who established large dairy operations.

In Lesotho, sporadic imports of dairy cattle were made by some local farmers from South Africa. Due to lack of formalized dairy policy, a variety of dairy breeds were imported by individuals including Frisian, Brown Swiss, Guernsey, Ayrshire and Jerseys. Of these cows, the Guernseys and Ayrshires were less common. This is

similarly true in RSA where Lesotho farmers purchased these cows. The imported cows added to the indigenous stock, and cross-breeding ensued. A typical herd was composed of gross breeds with less obvious traits attributable to any of the dairy breeds initially imported.

From a publication of the Ministry of Agriculture, whose date could not be ascertained, 16 percent of the 2,238 cattle inspected were found to be obvious cross breeds. The remainder were reported to have belonged to the Sanga group of the indigenous African cattle. These cattle are genetically poor milk producers. Necessarily, therefore, milk sales from a typical cattle holder was insignificant as the production was of a subsistence nature. Milking was done mainly for home consumption.

5.2.2 Dairy Farming After Independence

Significant developments have taken place regarding the support for dairy development after independence. Since the 1970s, efforts were made to build up the infrastructure and consolidate the policy and the marketing system. Farmers were advised to do dairy farming based on selected breeds, hence streamlining the variety of cows imported by farmers. The livestock import controls and levies, which became effective in 1984, limited imports to approved breeds only.

In the 1970s the government did not aggressively entice farmers to produce milk for the market, but instead the paramount goal was to improve the household diet. More changes were realized in the 1980s, when the policy pronouncement put emphasis on increased production not only to meet household needs but also for marketing. This initiative introduced the notion of dairying as a business enterprise which should meet the farmers' cash needs. Since then, commitment to the attainment of self-sufficiency in milk production has become the primary goal of the government.

5.2.3 The Criteria for Choosing Dairy Cows

The changes in government policy necessitated changes in recommended cows of choice. The changes in government policy have by and large been influenced by donor assistance, though other factors also had a role. Regarding the choice of cows, five major factors are seen to have been instrumental in shaping the dairy herd composition in Lesotho. These factors are:

i) the level of market development,
ii) preference for particular qualities of a product,
iii) the demand for draught power,
iv) endurance and adaptability of a particular breed, and
v) the genetic quality and potential for milk production.

In the absence of a well developed marketing system where milk sales are

predominantly to neighbours, dual purpose animals were suitable. In the highlands of Lesotho, the government has promoted the Brown Swiss cows which are successful dual purpose animals. They have an advantage over the other exotic cows in that they are hardy; they adapt better to mountain conditions and maintain an adequate amount of milk under grazing where supplemental feeding is maintained at a minimum level. In addition to these qualities, the Brown Swiss have offsprings which are good for draught power.

Whereas the Jerseys were initially promoted, less weight is now placed on them since they are low milk producers. Therefore, the Jerseys are not favourable to the goal of self-sufficiency, even though their milk's fat content is high. The marketing system based on the concept of "milk is milk" does not favour Jerseys since the pricing system does not permit a premium on high fat content. If the pricing system allowed for a premium on fat content, the Jersey would perhaps become attractive as the premium would compensate for the low production. The other limiting factors which work against the Jersey are that they make poor draught animals and are not good meat producers.

However, the Jersey does have merit. Other than the high fat content, their smaller body size (300 - 400 Kg) suits a small farmer because of low maintenance costs. In the 1970s, the Livestock Division of the Ministry of Agriculture designated the Frisian as a national breed of choice in the lowlands. However, support for Brown Swiss as a suitable cow for the mountain regions has continued. The Frisian is a high milk producer which fits the goal of increased milk production aimed at self-sufficiency in milk production. But they are less hardy than the Brown Swiss, and hence are not recommended for the mountain areas.

The policy in favour of Frisians, though conceived in Lesotho, was also a result of the participation of the Canadian International Development Agency (CIDA). A number of other donor assisted agricultural development projects, mostly in the lowlands, have supported the Frisian. The Mphaki project in the mountain areas has been extremely successful in its promotion of the Brown Swiss.

5.2.4 Market Development

The first major attempt made to entice farmers to produce for the market in Lesotho was the construction of a dairy plant. The dairy structure was established in 1973 at Botsabelo, in the periphery of the capital city of Lesotho. FAO and UNICEF, under a cooperative agreement with the government of Lesotho, funded the undertaking. At about the same time, a dairy farm (which has since been operated by the government) became the sole supplier of milk to the processing plant. The initial plant capacity was limited to 1,500 litres per day, reflecting on the small local production base.

The principal function of the processing plant was to process and package milk

as well as perform a marketing function. The management of the dairy plant was assumed by government, a factor which resulted in many inefficiencies and losses. The involvement of Canadians in the plant management facilitated the reassessment of government participation in order to correct the inefficiencies. The underlying result has been the privatization of the plant. This development followed the expansion of the dairy plant. CIDA supported the construction of a new dairy plant in place of the older one on the same site. The new plant became operational in 1986 with a daily processing capacity of 10,000 litres.

5.2.5 Major Companies in the Milk Trade

At the time of the study there were three major RSA dairy plants trading in milk and milk products in Lesotho. The three companies are located within 50 km of the nearest Lesotho/RSA boarder posts, where the nearest was approximately 15 km. The respective locations of the dairy plants are Tweespruit, Pinekloof and Slabberts. The short distances rendered Lesotho a strategic market for the plants, which apart from dairy products also marketed fruit juices. The Lesotho dairy company was largely ill equipped to compete effectively with these companies and had a limited output.

All three foreign companies are located on the north western border of Lesotho. This factor resulted in an irregular distribution of milk to the two southern districts covered in the study. There was a tendency for these foreign companies to make deliveries to the Southern districts (Mafeteng and Mohales'Hoek) only when the excess could not be absorbed within the markets which were closer to the plants.

5.2.6 Survey of Retail Outlets

In order to assist in the development of market outlets for the new dairy plant, a survey was conducted to elicit information regarding the distribution system of milk, the types and sizes of packages used by the dairy companies, and the identification of major marketing centres. A sampling method was not adopted for the survey; instead all retail outlets in the study area were covered.

Table 5.1 highlights the different package sizes and forms of milk in the study area. Maseru district showed the highest sales of milk, amounting to about 60 percent of the total. It was followed by Leribe (14 percent) and Berea (10 percent). The other three districts jointly shared 16 percent of the total milk sales. The Maseru district dominated the sales primarily because of its large population; it was strategically placed to the suppliers, it enjoys a higher density of retail outlets, and it was relatively more urbanized.

For reasons advanced about the irregularity of milk deliveries to the south, it would be misleading to conclude that low milk sales in Mafeteng and Mohales'Hoek are indicative of low effective demand. The potential demand is deemed to be significantly higher. To ensure a balanced distribution commensurate with effective demand, it

Table 5.1 Weekly Retail Milk Sales (litres) by Form and Package Size

	Package Size (in litres)							
AREA	0.25 Fresh	0.5 Fresh	1 Fresh	0.5 L.Life	1 L.Life	Sour Milk	Total Milk	% of Total*
Maseru	3251	7148	5471	13567	2111	3697	35245	59.91
Butha-Buthe	539	1023	20	1405	0	369	3356	5.70
Leribe	809	2406	788	3992	0	363	8358	14.21
Berea	420	1551	384	3201	0	432	5988	10.18
Mafeteng	255	872	92	2226	0	237	3682	6.26
Mohales Hoek	195	623	0	1214	0	172	2204	3.75

Source: Survey of Retail Outlets (S.R.O), 1986.
* Compares each area total to total of all areas.

became imperative that the Lesotho dairy company expand milk sales to the South. This irregularity has since been corrected.

Two main factors were found to determine the consumer preference for the package sizes of milk. These are the availability of refrigeration facilities and the level of urbanization. In general, half litres were the most commonly purchased units while the litre units were least patronized. The least urbanized areas like Butha-Buthe, Mohale's Hoek and Mafeteng have a lower incidence of litre units. For the entire study area, the share of long-life milk was 44.5 percent while the regular fresh milk constituted 45 percent, the residual being accounted for by sour milk.

5.2.7 The Organizational Structure and National Dairy Board

In 1984 an ad hoc body called the Lesotho Dairy Development Committee was formed. It consisted of representatives from four ministries, including the Ministry of Agriculture, and a CIDA representative. The committee was charged with the responsibility to establish a National Dairy Board and draw up the legislation. It also assumed responsibilities which would otherwise be performed by the Dairy Board.

The National Dairy Board has since been formed while the committee was disbanded. The Dairy Board initiated the endeavour to privatize the dairy plant which is now run on a commercial basis as Lesotho Dairy Products Corporation Ltd. The move is in line with the current nation wide policy of privatization which is also consistent with the IMF austerity measures. To ensure proper coordination, key ministries, namely the Ministry of Health, the Ministry of Trade, Industry and Tourism, Ministry of Finance and the Ministry of Agriculture are represented on the Dairy Board.

5.3 Development of the Empirical Model

The divergence between the potential and actual realization in development of agriculture is of concern to policy makers who desire to implement policies and programs which will stimulate production and increase economic contribution of the sector. Choosing a policy and programs consistent with the development goals and resources is a difficult exercise. The program opted for often result in complex and multiple effects on the economy. Despite these unavoidable circumstances, systematic modelling often provides a framework to evaluate even the most profound implications of economic stimuli and programs on various selected economic agents and indicators.

The analysis demanded simulation of prices, quantities, and implications for production and consumption among spatially separated markets. Based on literature, the spatial equilibrium model was found to be the appropriate tool since it interconnects the supply and demand areas via transportation costs. As a result, a simultaneous evaluation of implications among regions can be undertaken for several economic stimuli under investigation.

5.3.1 Description of the Benchmark Model

It is customary for studies adopting programming models to seek an initial solution which closely replicates the status quo of the activity levels. The model presented below was developed to simulate the fresh milk subsector in Lesotho based on the retail survey data conducted in 1986. It is on the basis of a benchmark solution that various policy effects were evaluated to derive the relative changes. In order to do the static comparative analyses of results under different policy shocks, appropriate modifications had to be made on the benchmark model. Adjustments were made on either the objective function, constraints, activities and combinations of changes. The objective function of the model is defined as the maximization of consumers' and producers' surplus subject to specified resource constraints and product balance equations. The objective function of this nature is commonly referred to as the social welfare function.

The schematic tableau which represents the general structure of the model developed is illustrated in Figure 5.1. The schema presented in Figure 5.1 does not, however show all the activities and constraints of the complete model tableau, which was too large for presentation here. The variables and constraints that are omitted are those that are handled in a manner very similar to those in the schema. So in general, the partial tableau in Figure 5.1 fulfils the purpose of describing the structure of the complete model.

	Plant	IMPO	RM1	RM2	RM3	RM4	RM5	P_1^1	P_2^1	P_3^1	P_4^1	P_1^2	P_2^2	P_3^2	P_4^2	X_{11}	X_{21}	X_{12}	X_{22}	
Objective Function	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	-	-	R.H.S.
Product Balance	1	1						-1	-1	-1	-1	-1	-1	-1	-1					≥ 0
Factor Balance	-α		1	1	1	1	1													≥ 0
			1																	≤ RS1
Identity Submatrix				1																≤ RS2
For Raw Milk					1															≤ RS3
Supply Function						1														≤ RS4
Segments							1													≤ RS5
Identity Submatrix								1												≤ DM_1^1
For Demand									1											≤ DM_2^1
Function 1										1										≤ DM_3^1
Segments											1									≤ DM_4^1
Demand 1 Balance								1	1	1	1					-1	-1			≤ 0
Identity Submatrix												1								≤ DM_1^2
For Demand													1							≤ DM_2^2
Function 2														1						≤ DM_3^2
Segments															1					≤ DM_4^2
Demand 2 Balance												1	1	1	1			-1	-1	≤ 0
Source 1 Inventory																1		1		≤ 0
Source 2 Inventory																	1		1	≤ 0

Figure 5.1 A Schematic Tableau of Lesotho Dairy Model.

The first row with a series of "+" and "-" signs presents the nature of the objective function. The "+" signs were used to indicate the objective function coefficients that correspond to activities which add to the objective function value. Those are, in effect, the selling activities. Alternately, the negative signs "-" belong to the objective function coefficients associated with activities leading to the reduction of the objective function value.

The complete benchmark model consists of 444 variables and 428 constraints. The main factors which contributed to the large size of the model were the incorporation of the piece-wise supply and demand functions and the transportation sub-matrix. The model allows for the processing of raw milk in Lesotho and imports of processed milk from South Africa. It then builds in the unit transfer costs for marketing the product between all designated regions.

The demand functions, although developed exogenously, are all specified endogenously in the model. Similarly, the raw milk supply response is endogenous. All the other variables are handled as exogenous factors to the model. The specific activities and constraints are individually discussed below.

The first activity labelled "PLANT" in Figure 5.1 is concerned with the Botsabelo milk processing plant, the solution level of which represents the total annual litres of fresh milk processed by the plant. The objective function coefficient associated with "PLANT" activity is the per litre processing cost. Added to the processing cost was the unit marketing margin as calculated from the survey of retail outlets. The margin was calculated at 25 cents per litre as the difference between the average price at which the stores purchased milk and their average sale price.

The Botsabelo plant is allowed to process and package all the milk delivered by a nucleus of dairy farmers in the locality. The supply of raw milk to the plant is treated as an input to which the "PLANT" processing activity is applied to produce a final product in the form of packaged processed milk. Associated with any milk processing plant are milk losses that occur in the line of processing and handling. The coefficient "α" corresponding to the "PLANT" activity and "FACTOR BALANCE" constraint in the schematic tableau provides for the percent processing loss. A conservative level of 1.5 percent loss was assumed for the plant.

The second set of activities corresponds to the processed milk imports. There are three such activities in the model representing possible import alternatives from three South African supply regions. However, only one of those activities labelled "IMPO" is illustrated in the schema in Figure 5.1. For each case the solution level indicates the total number of litres imported. The corresponding objective function coefficients are the f.o.b. unit prices of processed milk at each of the import sources in South Africa to which the retail markup was also added.

The subsequent set of activities labelled "RM_1", "RM_2" to "RM_5" correspond to different segments on the raw milk supply response function. The full model contains 77 such activities. Each activity solution level represents quantity increments purchased by the Botsabelo plant with increase in price. The objective function coefficients associated with those activities are the respective prices up the supply response function. From each segment to the next is the two cents price difference which represents the sizes of the steps.

The next activity sets represent the series of segmented demand functions for the product by individual regions. The model contains six demand functions, each of which is provided through an array of selling activities. The tableau illustrates only two of these functions. Further, each function is only demonstrated for three selling activities rather than the whole range as was done in the complete model tableau. The first three selling activities named "P_1^{1}", "P_2^{1}" "P_3^{1}" and P_4^{1} relate to the first demand function in region 1. The second set of activities "P_1^{2}", "P_2^{2}" "P_3^{2}" and P_4^{2} belong to the second demand function for region 2. The objective function coefficients corresponding to the activities are the prices associated with individual segments on the piece-wise functions.

For each single demand function, the prices are specified in a descending price order. The solution procedure followed is such that the model brings into solution the sale of the product (milk) at the highest price first, followed by subsequent prices in a declining order.

The last set of activities in the schema belongs to the transportation costs sub-matrix. The complete model contains 24 such activities. Each activity solution presents the total number of litres for processed milk traded between two regions. The subscripts refer to the direction of trade between regions. For example, the variable X_{21} refers to the volume of trade occurring between excess supply region 2 and the excess demand region 1 for a particular static equilibrium solution.

The technical coefficients associated with the raw milk supply function, the demand functions and the transportation sub-matrix, jointly form a block diagonal matrix. The first block in Figure 5.1 relates to the raw milk supply function, the next two to the demand functions with the last associated with transportation sub-matrix.

The first constraint "PRODUCT BALANCE" is the processed milk balance equation. The equation ensures that the total supply of processed milk (local plus imports) at least meets the sum of total demands over all six regions. The second constraint "FACTOR BALANCE" is associated with the supply of raw milk to Botsabelo dairy plant.

Next is a set of constraints corresponding to each segment of the raw milk supply response function. The coefficients are in a form of an identity matrix. The first constraint "RS_1" contains the initial quantity purchased at the lowest price. The subsequent constraints specify the quantity increments for every two cents price increase

along the response function. Each technical coefficient on the identity sub-matrix has a corresponding coefficient in the "FACTOR BALANCE" equation. In that manner the "FACTOR BALANCE" constraint helps to add up the total supply of raw milk along all the segments which come into basis in the model solution.

The next block of identity sub-matrix contains part of the technical coefficients paired with the individual segments of the first demand function. The first constraint "DM_1^1" specifies the initial quantity sold at the highest price on the demand function. The subsequent constraints carry the quantity increments sold for every 2 cents price decrease down the demand function. Associated with each coefficient in the identity sub-matrix is another coefficient in the next constraint "DEMAND1 BALANCE". The "DEMAND1 BALANCE" equation adds up all the demand segments quantities. It also shows via coefficients corresponding to "X_{11}" and "X_{21}", that the demand can be met by supply from all possible supply regions. Similar interpretation is true for the second demand function block and other functions which are not demonstrated in the illustration tableau.

The actual number of constraints for each demand function is equal to the number of selling activities which in turn are equal to the number of segments. The case holds true for the raw milk response function where the number of constraints and activities equal the number of segments specified.

The complete benchmark model contains four constraints similar to the last two constraints shown in Figure 5.1. They ensure that the total quantity of shipments from each of the supply regions does not exceed production from each of those sources. In other words there is no possibility of excess demand.

5.3.2 Formal Presentation of the Benchmark Model

Thus far the general structure of the tableau has been described using only part of the entire tableau. The equations used to present the precise form of the benchmark model are now presented. The objective function of the model is specified as maximizing

$$SW = \sum_{j=1}^{6}\left[P_n^j Q_n^j + \sum_{k=1}^{m_1^*} P_{n-k}^j [Q_{n+k}^j - Q_{n+(k-1)}^j]\right] -$$

$$\left[P_g q_g + \sum_{r=1}^{m_1^*} P_{q+r}(q_{g+r} - q_{g+(r-1)}\right] - PROCC - IPC - \sum_{j=1}^{6}\sum_{i=1}^{4} t_{ij} X_{ij}$$

Sum of areas under demand functions - Area under raw milk supply function - Milk processing costs

- F.O.B costs of imports
- Product transport costs

The function operationally maximizes the estimate of producers' and consumers' surplus, subject to a set of conditions which have to be met as follows:[1]

$$\sum_{j=1}^{6} X_{ij} \leq X_i \qquad (\text{for all } i = 1,2,3,4)$$

$$\sum_{i=1}^{4} X_{ij} \geq Y_j \qquad (\text{for all } j = 1,2,.....6) \qquad \text{where}$$

Y_j, X_i and $X_{ij} \geq 0$ for all ij

where:

SW	=	social welfare
P^j_n	=	price at first segment of demand function in area j
Q^j_n	=	quantity demanded at highest price (P_n) in demand area j
n	=	designates the first segment on each demand function
n-k	=	subsequent segment indices on demand function from price axis
n+k	=	segment indices on demand function (corresponding to n-k) from quantity axis
m_l.	=	equilibrium point where aggregate demand and supply intersect. Subscript l was used to denote the possibility of equilibrium occurring after unequal number of segments across the individual regional functions.
P_g	=	price at first segment of raw milk supply response function
q_g	=	quantity of raw milk purchased at lowest price (P_g)

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[1]A comparable objective function with continuous functions as often expressed in quadratic programming problems would be of the form

$$W(Y,X) \equiv \sum_{i=1}^{n} W_i(Y_i,X_i) \equiv \sum_{i=1}^{n} \left[\int_{\hat{Y}_i}^{Y_i} f(\theta_i - w_i Y_i)dY_i - \int_{\hat{X}_i}^{X_i} f(V_i - \mu_i X_i)dX_i \right] \qquad \text{and}$$

| +/- other terms which are exogenous| where

$\hat{Y}_i$, $\hat{X}_i$ are pre-trade demand and supply levels
Y_i, X_i are post trade demand and supply levels
See Martin (1981).

g	=	index for the first (lowest) price on raw milk response function
g+r	=	subsequent segment indices up the raw milk response function
g+(r-1)	=	segment index preceding g+r up the response function
q_{g+1}	=	quantity purchased at segment g+r
$q_{g+(r-1)}$	=	quantity purchased at segment g+(r-1)
PROCC	=	total processing costs at Botsabelo dairy plant
IPC	=	f.o.b. cost of imports
t_{ij}	=	unit transport cost of final product from source i to demand area j
X_{ij}	=	volume of interregional trade from excess supply region i to excess demand region j
X_i	=	total supply in region i
Y_j	=	total demand at region j

The first constraint ensures that total shipments from excess supply area i to the six excess demand areas will be equal to or less than total production at that source. So there is no possibility of shipments in excess of what can be produced by a given source. The second constraint implies that total shipments received by the j^{th} demand area from all four supply origins may exceed the effective demand. In other words, there is a possibility of excess supply. The last condition enforces the observance of traditional non-negativity conditions of programming models.

5.4 Analysis and Results

5.4.1 Benchmark Model Validation

Model validation is a broadly based topic with a long history in the literature of applied research. As noted by McCarl (1984) "The true model validation is not possible. Nevertheless, model validation exercises improve the relevance of models and strengthen the theoretical basis for modelling". The process could be viewed as an exercise undertaken primarily for the purpose of establishing how closely the model replicates the situation it is perceived to reproduce. Different validation procedures are used in agricultural economics models (most notably econometrics and mathematical programming) used for simulation of probable impacts (Kunkel et al., 1978).

While all economic studies are often constrained by paucity of data in one way or another, the bottleneck is even more inherent in the studies undertaken in developing countries like Lesotho. Absence of published data made it even more difficult to evaluate the performance of the model. Data from the survey of retail outlets were used to evaluate how well the model approximated the regional quantities and prices for milk in Lesotho. The percentage deviations were calculated as a way of evaluating the validity of the model (Furtan, et al., 1978; Cappi et al., 1978). The specific variables are presented in Table 5.2.

Table 5.2 Validation of Benchmark Model

	Base Year	Bench Mark	% Deviation
AGGREGATE QUANTITIES (Litres)			
Local supply	770,402	788,152	2.30
Imports	1,344,03	1,253,254	-6.75
Total	2,114,433	2,041,406	-3.45
REGIONAL PRICES (Maloti per litre)			
Maseru	1.01	1.05	3.96
Butha-Buthe	1.21	1.03	-14.88
Leribe	1.06	1.04	-1.89
Berea	1.21	1.05	-13.22
Mafeteng	1.21	1.05	-13.22
Mohales Hoek	1.17	1.07	-8.55
REGIONAL CONSUMPTION (Litres)			
Maseru	1,532,642	1,493,188	-2.57
Butha-Buthe	82,277	90,233	9.67
Leribe	208,182	210,735	1.23
Berea	122,460	132,988	8.60
Mafeteng	63,362	69,392	9.52
Mohales Hoek	42,510	44,870	5.55

Source: Survey of Retail Outlets and Estimation

It is evident from the table that in general, the model approximated more closely the regional consumption and aggregate quantities than it did the regional prices. All the quantity variables were approximated within a 10 percent range. The regional consumption levels in five of the areas tended to be overestimated; the exception was Maseru whose level was slightly underestimated. Prediction error on prices varied within a range of 15 percent. The model underestimated the prices in five of the regions with the Maseru region price being overestimated. This is the reverse situation when compared to the outcome of regional demand quantities. In general, the performance of the model was deemed to be satisfactory for the purpose of examining alternative policies.

5.4.2 Impacts From Application of Non-trade Policy Scenarios[2]

The results are outlined in Tables 5.3 and 5.4 for Cases A1, A2 and A3.

Case A1: Importation of Raw Milk for Local Processing The results are outlined in Table 5.3. By allowing raw milk imports for processing in Lesotho, the obvious effect was to increase the processed milk output from the local plant. The processed milk throughput from the plant more than doubled. It was matched at the same time by a substantial decline in imports of processed milk. The price of imported raw milk was set at 0.40 per litre which was the gazetted price at the farm level in the RSA.

The total processed milk supply increased by 2.3 percent since the drop in imports of processed milk was more than offset by the increase in output locally. The increase in supply led to a decline in regional milk prices. The exception was the Butha-Buthe demand region where the price was not affected. In the other five regions, prices dropped by 1.92 percent in Leribe, 3.74 percent in Mohale's Hoek to 3.81 percent for Maseru, Berea and Mafeteng. Similarly, the quantities demanded were affected by the policy, with the exception of Butha-Buthe. The demand increases in the other five regions ranged between 1.21 percent to 2.64 percent. The implication was that Butha-Buthe milk consumers would not stand to gain from a policy of this nature since they are strategically placed for imports.

The objective function value increased leading to a 15 percent increase in consumer surplus and 14.5 percent decrease in producer surplus. The overall objective function increased by 11.8 percent, while producer revenue increased by 6.5 percent. Allowing for raw milk imports resulted in a significant change in the trade flow pattern. The Lesotho dairy plant captured all the markets except Butha-Buthe. The Tweespruit plant lost the Maseru market, Slabberts lost the Leribe and Berea markets to Botsabelo but did not lose the entire market share in Butha-Buthe. It retained 38 percent of the market in Butha-Buthe, with the remainder absorbed by Botsabelo. In general, the policy led to a marked decrease in foreign competition for the processed milk markets.

Case A2: Reconstitution of Milk Powder This option resulted in no change in equilibrium prices and regional demand quantities, but significant changes occurred in the distribution. Supply from Botsabelo increased by 450,847 litres, but this was matched by an equal decrease in imports. As a result the benchmark aggregate supply solution was not affected. Since blending reconstituted milk with raw milk becomes a relatively cheap option based on the skim milk powder price, the model allowed for increased purchases of raw milk from farmers offering a higher price.[3] The raw milk

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[2] The term "non-trade" is used in the text to denote policy options which are non-protectionist by nature or in other words without artificial trade barriers.

[3] Sensitivity analysis, not conducted, could determine the maximum price for skim milk powder and butter fat that would allow reconstitution.

Table 5.3 Differential Impacts of Non-trade Policy Options; Cases A1, A2, A3.

	Bench Mark	Case A1	% Change	Case A2	% Change	Case A3	% Change
(Maloti)							
OBJECTIVE FUNCTION	1,861,495	2,080,149	11.75	1,952,510	4.89	2,197,807	18.07
Consumer Surplus	1,653,073	1,901,952	15.06	1,653,073	0.00	2,106,766	27.45
Producer Surplus	208,422	178,197	-14.50	299,437	43.67	91,041	-56.32
PRODUCER REVENUE	1,323,863	1,238,453	-6.45	1,537,389	16.13	939,516	-29.03
TRANSPORTATION BILL	83,907	80,255	-4.35	78,947	-5.91	89,157	6.26
PROCESSING COSTS	291,616	759,998	160.62	448,753	53.88	849,025	191.14
PRICES (Maloti per litre)							
Maseru	1.05	1.01	-3.81	1.05	0.00	0.85	-19.05
Butha-Buthe	1.03	1.03	0.00	1.03	0.00	0.85	-17.48
Leribe	1.04	1.02	-1.92	1.04	0.00	0.86	-17.31
Berea	1.05	1.01	-3.81	1.05	0.00	0.85	-19.05
Mafeteng	1.05	1.01	-3.81	1.05	0.00	0.85	-19.05
Mohales Hoek	1.07	1.03	-3.74	1.07	0.00	0.85	-20.56
QUANTITIES (Litres)							
(Regional consumption)							
Maseru	1,493,188	1,532,642	2.64	1,493,188	0.00	1,690,458	13.21
Butha-Buthe	90,233	90,233	0.00	90,233	0.00	98,189	8.82
Leribe	210,735	213,288	1.21	210,735	0.00	233,712	10.90
Berea	132,988	135,620	1.98	132,988	0.00	146,148	9.90
Mafeteng	69,392	70,732	1.93	69,392	0.00	76,092	9.66
Mohales Hoek	44,870	45,814	2.10	44,870	0.00	50,062	11.57
Total	2,041,406	2,088,329		2,041,406		2,294,661	
PROCESSED SUPPLY							
Lesotho	788,152	2,054,049	160.62	1,238,999	57.20	2,294,661	191.14
Imports	1,253,254	34,280	-97.26	802,407	-35.97	0	-100.00
Total	2,041,406	2,088,329	2.30	2,041,406	0.00	2,294,661	12.41
RAW MILK SUPPLY							
Lesotho	799,974	740,830	-7.39	947,834	18.48	533,826	-33.27
Imports	n/a	1,344,030		n/a	n/a	1,221,590	
Total	799,974	2,084,860	160.62	947,834	18.48	1,755,416	119.43
RECONSTITUTION	n/a	n/a	n/a	309,750		573,665	
PRODUCER PRICE	0.62	0.58	-6.45	0.72	16.13	0.44	-29.03

Source: Estimation

price to farmers was increased by 16 percent. This occurred because the Botsabelo plant required local milk for blending with milk powder, and with the low cost of skim milk powder it was able to pay producers a higher return and still compete with RSA processed milk. In this case the model did not allow the importation of raw milk from the RSA. It will be seen in Case A3 with the raw milk imports that the producer price actually declines and local milk production and plant deliveries decline.

Table 5.4 Differential Impacts of Non-trade Policies on Trade Flows; Cases A1, A2, A3.

	Bench Mark	Case A1	% Change	Case A2	% Change	Case A3	% Change
Botsabelo to							
Maseru	673,890	1,532,642	127.43	1,194,129	77.20	1,690,458	150.85
Butha-Buthe	0	55,953		0	0.00	98,189	
Leribe	0	213,288		0	0.00	233,712	
Berea	0	135,620		0	0.00	146,148	
Mafeteng	69,392	70,732	1.93	0	-100.00	76,092	9.66
Mohales Hoek	44,870	45,814	2.10	44,870	0.00	50,062	11.57
Tweespruit to							
Maseru	819,298	0	-100.00	299,059	-63.50	0	-100
Butha-Buthe	0	0		0	0.00	0	0.00
Leribe	0	0		0	0.00	0	0.00
Berea	0	0		0	0.00	0	0.00
Mafeteng	0	0		69,392		0	0.00
Mohales Hoek	0	0		0	0.00	0	0.00
Slabberts to							
Maseru	0	0		0	0.00	0	0.00
Butha-Buthe	90,233	34,280	-62.01	90,233		0	-100
Leribe	210,735	0	-100.00	210,735		0	-100
Berea	132,988	0	-100.00	132,988		0	-100
Mafeteng	0	0		0	0.00	0	0.00
Mohales Hoek	0	0		0	0.00	0	0.00

Source: Estimation

The overall objective function increased by 4.9 percent. The increase in producer surplus was by 43.7 percent while the consumer surplus remained unchanged. In turn the producer revenue increased by 16.1 percent.

The trade flow patterns were appreciably affected by the policy. The Botsabelo plant's market was expanded particularly in the Maseru district. The redistribution resulted in Tweespruit losing approximately 64 percent of its market share in Maseru. At the same time, Tweespruit gained access to the entire Mafeteng market lost by Botsabelo. But on the net volume basis, an overall access of Tweespruit to Lesotho markets diminished by 55 percent from the benchmark position. Slabberts maintained its full market share positions in Butha-Buthe, Leribe and Berea. The policy in effect led to a marginal decrease in imports when compared to Case A1.

Case A3: Allowing raw milk imports plus reconstitution The joint impact of Cases A1 and A2, resulted in an appreciable drop in all regional prices. In five of the markets, prices dropped to M0.85 per litre and M0.86 per litre in Leribe district. The price

decline lay in the range of 17 percent to 21 percent of the benchmark solutions.

As a result of lower prices, the quantity demanded increased significantly in all regions. The highest percentage increase (13.21%) occurred in Maseru with the lowest (8.82%) occurring in Butha-Buthe. The producer price in Lesotho declined to the level of the raw milk import price (M0.44 per litre) which set the producer price ceiling in Lesotho. This combination of policy alternatives resulted in a net social welfare increase of 18 percent. Consumer surplus increased by 27.45 percent while a loss of 56 percent in producer surplus occurred.

It was obvious that reconstitution (25 percent maximum allowed) was constrained by the quantity of milk available to the plant in Lesotho under Case A2. Under Case A3 where raw milk imports were allowed, reconstitution increased.

There was a marked impact on distribution. Botsabelo captured all the markets and foreign competition was completely eliminated. The shadow prices were M0.34, M0.20 and M0.17 for the import activities associated with the three export regions Pinekloof, Tweespruit and Slabberts respectively. These results indicate, as it was also obvious from cases A1 and A2, that Slabberts is more competitive in the Lesotho markets than the other two export regions. It was true for the three Northern demand regions Butha-Buthe, Leribe and Berea. In general, the magnitudes of impacts from the joint policies far exceeded those separately generated from cases A1 and A2.

5.4.3 Impacts from Application of Import Tariff

The results are outlined in Tables 5.5 and 5.6 for Cases B1 and B2.

Case B1: Imposition of import tariff on processed milk. The policy led to an overall decrease in milk demand levels as prices generally rose by over 20 percent in all six demand regions. Quantities demanded declined between 11 percent and 16 percent in the regions. While imports decreased by 52 percent the supply from Botsabelo increased by about 44 percent. Overall supply decreased by 15 percent.

The objective function value declined by approximately 12 percent. The producer price rose from M0.62 to M0.86 per litre which is a 38.7 percent increase. The implication drawn from this is that the raw milk consumers will pay a higher price as the raw milk supply is shifted into processing. Hence for the low income consumers, this would decrease consumption and may even result in a lower nutrition level which is socially undesirable. The consumer surplus decreased by 28 percent while the increase in producer surplus more than doubled.

While the magnitudes of trade flows were affected, the direction of flows remained unchanged. In other words, each source continued to ship milk to the original markets but with less or more quantity delivered. Notably, Botsabelo increased its supply to Maseru by just more than half while it had a cutback in supply to Mafeteng

Table 5.5 Differential Impacts of Tariff Policies; Cases B1, B2.

	Bench Mark	Case B1	% Change	Case B2	% Change
(Maloti)					
OBJECTIVE FUNCTION	1,861,495	1,629,044	-12.49	2,079,741	11.72
Consumer Surplus	1,653,073	1,189,594	-28.04	1,886,727	14.13
Producer Surplus	208,422	439,450	110.85	193,014	-7.39
PRODUCER REVENUE	1,323,863	1,836,326	38.71	1,281,158	-3.23
TRANSPORTATION BILL	83,907	66,034	-21.30	80,193	-4.43
PROCESSING COSTS	291,616	420,975	44.36	763,202	161.71
Tariff Revenue	n/a	148,875	n/a	0	0
PRICES (Maloti per litre)					
Maseru	1.05	1.29	22.86	1.03	-1.90
Butha-Buthe	1.03	1.27	23.30	1.05	1.94
Leribe	1.04	1.28	23.08	1.04	0.00
Berea	1.05	1.29	22.86	1.03	-1.90
Mafeteng	1.05	1.31	24.76	1.03	-1.90
Mohales Hoek	1.07	1.31	22.43	1.05	-1.87
QUANTITIES (litres)					
(Regional consumption)					
Maseru	1,493,188	1,256,464	-15.85	1,512,915	1.32
Butha-Buthe	90,233	79,625	-11.76	89,349	-0.98
Leribe	210,735	180,099	-14.54	210,735	0.00
Berea	132,988	117,196	-11.87	134,304	0.99
Mafeteng	69,392	60,682	-12.55	70,062	0.97
Mohales Hoek	44,870	39,206	-12.62	45,342	1.05
Total	2,041,406	1,733,272		2,062,707	
PROCESSED SUPPLY					
Lesotho	788,152	1,137,771	44.36	2,062,707	161.71
Imports	1,253,254	595,501	-52.48	0	-100.00
Total	2,041,406	1,733,272	-15.09	2,062,707	1.04
RAW MILK SUPPLY					
Lesotho	799,974	1,154,838	44.36	749,618	-6.29
Imports	n/a	n/a	n/a	1,344,030	
Total	799,974	1,154,838	44.36	2,093,648	161.71
PRODUCER PRICE	0.62	0.86	38.71	0.60	-3.23

Source: Estimation

Table 5.6 Differential Impacts of Tariff Policies on Trade Flows; Cases B1, B2.

	Bench Mark	Case B1	% Change	Case B2	% Change
Botsabelo to					
Maseru	673,890	1,037,883	54.01	1,512,915	124.50
Butha-Buthe	0	0	0.00	89,349	
Leribe	0	0	0.00	210,735	
Berea	0	0	0.00	134,304	
Mafeteng	69,392	60,682	-12.55	70,062	0.97
Mohales Hoek	44,870	39,206	-12.62	45,342	1.05
Tweespruit to					
Maseru	819,298	218,581	-73.32	0	-100.00
Butha-Buthe	0	0	0.00	0	0.00
Leribe	0	0	0.00	0	0.00
Berea	0	0	0.00	0	0.00
Mafeteng	0	0	0.00	0	0.00
Mohales Hoek	0	0	0.00	0	0.00
Slabberts to					
Maseru	0	0	0.00	0	0.00
Butha-Buthe	90,233	79,625	-11.76	0	-100.00
Leribe	210,735	180,099	-14.54	0	-100.00
Berea	132,988	117,196	-11.87	0	-100.00
Mafeteng	0	0	0.00	0	0.00
Mohales Hoek	0	0	0.00	0	0.00

Source: Estimation

and Mohale's Hoek. Supply from Tweespruit fell from 819,298 litres to 218,581 litres in Maseru. Slabberts continued to retain the Butha-Buthe, Leribe and Berea markets but with a drop in volume shipped.

Case B2: Allowing raw milk imports with a tariff on processed milk. In effect this scenario examines the joint effects of case A1 and case B1. As already observed, cases A1 and B1 individually generated results with opposite impacts on prices, objective function value and most of the variables examined. This policy would be especially useful where increased milk processing in Lesotho was desired.

Because of the counteracting effects, the impacts on regional demand prices and hence quantities did not follow a single change of direction. In Leribe the price did not change with the policy, thus demand was not affected. In Butha-Buthe the price increased by M0.02 per litre causing the quantity demanded to decrease. For the other

four regions, the prices fell by M0.02 per litre from their benchmark positions increasing quantities demanded. In contrast, demand in Butha-Buthe showed a decrease whereas increases were realized in the other districts where prices declined. In Leribe where the price remained unchanged, the demand was not affected.

Although this policy option led to a 7 percent decline in the producer surplus, the net social welfare increased by 11.7 percent since the increase in consumer surplus more than offset the reduction in producer surplus. Producer price and revenue declined from the benchmark level and was 30 percent lower than Case B1.

The overall supply increased, but by less than the magnitude where case A1 was run alone. Foreign competition was completely eliminated in the markets, so all the milk requirements were met by milk processed locally. The shadow prices associated with the import activities were M0.43, M0.26 and M0.23 for Pinekloof, Tweespruit and Slabberts respectively. The interesting result observed from the ultimate direction of the impacts is that the impacts of raw milk importation more than offset the counteracting effects of the tariff in place.

5.4.4 Impacts from Application of Import Quota

The respective results of the cases discussed under this subsection are presented under Tables 5.7 and 5.8. Table 5.7 carries most of the variables whereas Table 5.8 presents the trade flows pattern. A quota was set at the level of 75 percent of the imported quantity of processed milk realized from the survey of retail outlets.

Case C1: Introduction of import quota on processed milk. The magnitudes of changes were significant but not as great as under the import tariff (Case B1).

Demand prices in all markets increased by close to 10 percent from the respective benchmark levels. The occurrence of high consumer prices resulted in a general decline in demand levels for all markets. The fall in quantity demanded ranged from approximately 5 percent to 7 percent of the benchmark situations among the regions.

The objective function declined by 0.7 with a 6.3 percent decrease in consumer surplus while producer surplus increased 43.7 percent. The producer revenue in turn increased by 16.1 percent as the producer price increased from M0.62 to M0.72 per litre.

Supply from the Botsabelo plant increased by approximately 15 percent. But the increase was by less than the fall in imports, leading to a net global decrease (6.28%) in milk available for the market. It is evident from Table 5.8 that the pattern of trade flows remained unchanged but the magnitudes of flows were affected. The shipment of processed milk from Botsabelo to Maseru increased while Tweespruit faced a cutback on its Maseru market share. Botsabelo remained as the only supplier to Mafeteng and

Table 5.7 Differential Impacts of Quota Policies; Cases C1, C2.

	Bench Mark	Case C1	% Change	Case C2	% Change
(Maloti)					
OBJECTIVE FUNCTION	1,861,495	1,848,908	-0.68	2,080,149	11.75
Consumer Surplus	1,653,073	1,549,471	-6.27	1,901,952	15.06
Producer Surplus	208,422	299,437	43.67	178,197	-14.50
PRODUCER REVENUE	1,323,863	1,537,389	16.13	1,238,453	-6.45
TRANSPORTATION BILL	83,907	76,789	-8.48	80,255	-4.35
PROCESSING COSTS	291,616	334,951	14.86	759,998	160.62
PRICES (Maloti per litre)					
Maseru	1.05	1.15	9.52	1.01	-3.81
Butha-Buthe	1.03	1.13	9.71	1.03	0.00
Leribe	1.04	1.14	9.62	1.02	-1.92
Berea	1.05	1.15	9.52	1.01	-3.81
Mafeteng	1.05	1.15	9.52	1.01	-3.81
Mohales Hoek	1.07	1.17	9.35	1.03	-3.74
QUANTITIES (litres)					
(Regional consumption)					
Maseru	1,493,188	1,394,553	-6.61	1,532,642	2.64
Butha-Buthe	90,233	85,813	-4.90	90,233	0.00
Leribe	210,735	197,970	-6.06	213,288	1.21
Berea	132,988	126,408	-4.95	135,620	1.98
Mafeteng	69,392	66,042	-4.83	70,732	1.93
Mohales Hoek	44,870	42,510	-5.26	45,814	2.10
Total	2,041,406	1,913,296		2,088,329	
PROCESSED SUPPLY					
Lesotho	788,152	905,273	14.86	2,054,049	160.62
Imports	1,253,254	1,008,023	-19.57	34,280	-97.26
Total	2,041,406	1,913,296	-6.28	2,088,329	2.30
RAW MILK SUPPLY					
Lesotho	799,974	918,852	14.86	740,830	-7.39
Imports	n/a	n/a	n/a	1,344,030	
Total	799,974	918,852	14.86	2,084,860	160.62
PRODUCER PRICE	0.62	0.72	16.13	0.58	-6.45

Source: Estimation

Table 5.8 Differential Impacts of Quota Policies on Trade Flows; Cases C1, C2.

	Bench Mark	Case C1	% Change	Case C2	% Change
Botsabelo to					
Maseru	673,890	796,721	18.23	1,532,642	127.43
Butha Buthe	0	0	0.00	55,953	
Leribe	0	0	0.00	213,288	
Berea	0	0	0.00	135,620	
Mafeteng	69,392	66,044	-4.82	70,732	1.93
Mohales Hoek	44,870	42,510	-5.26	45,814	2.10
Tweespruit to					
Maseru	819,298	597,832	-27.03	0	-100.00
Butha Buthe	0	0	0.00	0	
Leribe	0	0	0.00	0	
Berea	0	0	0.00	0	
Mafeteng	0	0	0.00	0	
Mohales Hoek	0	0	0.00	0	
Slabberts to					
Maseru	0	0	0.00	0	0.00
Butha Buthe	90,233	85,813	-4.90	34,280	-62.01
Leribe	210,735	197,970	-6.06	0	-100.00
Berea	132,988	126,408	-4.95	0	-100.00
Mafeteng	0	0	0.000	0	0.00
Mohales Hoek	0	0	0.00	0	0.00

Source: Estimation

Mohale's Hoek although the shipments were reduced. Similarly, Slabberts continued its stronghold in Butha-Buthe, Leribe and Berea but to all three markets supplies were reduced.

Case C2: Imposing a quota on processed milk plus allowing for raw milk imports. This policy is actually concerned with examining the joint effects of Case C1 and Case A1. As already observed, Case A1 tended to reduce consumer prices, increase the objective function value, increase regional demands, eliminate foreign competition in Maseru, Leribe and Berea markets, and reduce the producer price. But directly opposite results on the variables were generated by the model under case C1.

The results simulated under case C2 (Tables 5.7 and 5.8) turned out to have similar results as those under Case A1 where raw milk imports were allowed. This

resulted because the quota was not effective. The impact of raw milk imports (case A1) was so large that it reduced the imports of processed milk to a negligible level such that the import quota became redundant to the model solution.

5.5 Policy Implications and Conclusions

The results of the analysis indicate that Lesotho will continue to be in a difficult position in establishing a self-sustainable agricultural industry as long as well established and aggressive foreign firms still compete on a laissez faire basis. If the austere conditions under which local firms operate are to be eliminated, protection is required. However, this is the classic infant industry argument which need not be overemphasized. The intervention will need to be applied in such a way as to avoid accumulated market inefficiencies. Since this has a strong bearing on national policy making, the government should play a leading role in the formulation of unilateral policies and engage in bilateral and international negotiations on behalf of local industry. These general preconditions are equally relevant and should apply to the dairy industry.

It will, however, require a massive effort and time to develop the dairy industry and policy with a clear understanding of the underlying long run implications and impacts on the economy. It therefore, is imperative that during the initial stages of dairy development, a careful and only gradual implementation of new policies is exercised to avoid major economic repercussions.

Should import restrictions be imposed, they should be implemented on a piecemeal basis and perhaps critical and independent studies be undertaken in due course in order to assess the positive and negative effects. Provided restrictive policies are implemented, they should only be limited to the short run period since in the long run, a more open economy shall be desirable to avoid retaliation from the RSA.

At the farm level, emphasis should be placed on provision of basic production and extension services while market development should facilitate the timely and reliable movement of milk which is a highly perishable product. Failure to coordinate these two major services may lead to a slow development of the dairy industry. These operational activities can only be smoothly engineered if a conducive policy environment can be pioneered through the government in conjunction with the market participants. In other words, a strong bond between the farmers, the government and the service sector should be developed to facilitate the dissemination of information at different levels.

In the absence of market intervention against the foreign milk suppliers, two alternatives remain for the local dairy industry. First, the local milk product will have to be routed to new market areas, primarily the remote areas where competition is less severe. This option is, however, surrounded by uncertainty and risk since there is barely any market information to guide policymakers. Information is crucial for the laying out and planning of marketing strategies. Secondly, the local industry should be aggressive

enough to out compete the dominant South African dairy firms in the existing markets concentrated around the Lowland areas.

The results from the model indicated that significant economic gains can be realized if a careful mix of protective policies can be adopted. That is, a careful balance between the gains/losses to producers versus consumers should be of primary concern for policy development and implementation.

5.6 Research Needs

Presently, a number of information gaps and paucity of data hinders the full understanding of the dairy industry in Lesotho. To fill in these important information needs, the following alternatives and questions should be addressed:

(1) Research efforts should be directed to the farm level operations and systems in order to develop the means for, and advice on the appropriate enterprise development options.

(2) Should the dairy development be based on concentration centers or on evenly scattered production units? And what would be the implications on collection/ distribution of the product between the primary producers, the processing sector and the ultimate consumers?

(3) What would be the implications of future health enforcement policies to some of the primary producers of milk and consumers of milk in raw form if all milk had to be processed and packaged before reaching the market place?

(4) Lack of knowledge of household consumption habits, taste and preferences for different forms of milk and milk products call for indepth household research studies to document information among different household strata. Furthermore, can the consumption patterns and tastes for dairy products be meaningfully differentiated by location and income groups?

(5) Indepth studies focusing on the market structure, conduct and performance indicators should provide and highlight vital information for market development. Research on these aspects will enhance knowledge for marketing not only on milk and milk products, but also on other related product lines complementary to or competing with milk. It is of primary importance that if the locally produced milk has to replace or compete effectively with imports, then consideration need be given to diversification into such product lines as juices, yoghurt, ice cream and others which are supplied by the foreign dairy plants. These can only be efficiently mastered if there are some reliable market performance indicators and information provided through research efforts.

6

WOOL AND MOHAIR PRODUCTION AND MARKETING

None Mokitimi

6.1. Introduction

6.1.1 Problem Situation

The history of the Lesotho wool and mohair industry dates back to the mid 1800s when Basotho acquired Merino sheep and Angora goats. At this time the major agricultural products from Lesotho were grains: maize, sorghum and wheat. The grains were exported to the mining camps of Kimberly and the Witwatersrand in the RSA. By the end of the 19th century Lesotho grain production suffered a severe blow as the RSA imposed taxes on grains from Lesotho and imported cheap grain from the highly capitalized agriculture of the United States of America and Australia. In response Basotho turned increasingly to labour migration and wool and mohair production. Wool and mohair prices were high at this time and it is reported that the principal motive for the acquisition and expansion of Merino sheep and Angora goats was the cash income gained from the sale of wool and mohair (Hunter, 1987).

In the 1890's the quantities of grains exported from Lesotho far surpassed the quantities of wool and mohair exported. By the turn of the century grain exports had decreased such that by the early 1930's Lesotho became a net importer of grains. On the other hand the quantities of wool and mohair exported increased. Wool and mohair became Lesotho's major agricultural exports; they have continued to be so to the present. Wool and mohair sales are one of the major sources of income for Basotho farmers today.

From the time the wool and mohair industry started in Lesotho, traders dominated the wool and mohair marketing system. In the late 1940s, wool and mohair marketing co-operatives were established. These wool and mohair marketing co-operatives operated in competition with traders, but collapsed in the early 1960s. In 1973 the Livestock Marketing Corporation (LMC), a public corporation, was established to buy and sell wool and mohair. This was the first attempt by government to intervene directly in the wool and mohair marketing system. The government intervened because it was believed that the producer was confronted with unstable prices, inadequate marketing outlets and exploitative middlemen. The establishment of the LMC resulted in many traders being barred from handling wool and mohair. The LMC collapsed in 1978 and its operations were taken over by a newly formed section of the Ministry of Agriculture, the Livestock Products Marketing Services (LPMS) which is still operating.

The Lesotho wool and mohair marketing system has evolved from a free market

system in which private traders dominated, to one in which government is strongly involved. It is interesting to evaluate how the different market structures have influenced the performance of the marketing system. In order for farmers to receive good incomes from wool and mohair, the marketing system has to be efficient. Thus, the performance of the marketing system affects farmers' returns from producing wool and mohair and wool and mohair production.

6.1.2 Objectives of the Study

The overall purpose of this study was to evaluate how market structure affects the performance of the Lesotho wool and mohair marketing system. The specific objectives of the study were:

(i) To describe the market structure of the Lesotho wool and mohair industry before and after government intervention.

(ii) To develop an appropriate set of measures that can be used to evaluate the performance of the wool and mohair marketing system.

6.2 Wool and Mohair Production

When the first white missionaries arrived in Lesotho in 1833 they observed large herds of cattle, "fat tailed" sheep, and common or Boer goats. It appears that "fat tailed" sheep and common goats had been kept by Basotho in the pre-Lifaqane period. According to Mckee (1913) the first Merino sheep in Southern Africa were imported in 1793 from Spain where they are thought to have originated. Angora goats were imported from Turkey in 1838. Angora goats are thought to have originated from the district of Ankara in Turkey. Basotho acquired Merino sheep and Angora goats through raids, stock theft and labour migration.

By the end of the 1880s the populations of Merino sheep and Angora goats increased rapidly such that they outnumbered the indigenous breeds. The most dramatic increase in Lesotho's small stock population seems to have occurred in the 1904 to 1911 period when the number of small stock increased from approximately half a million to over 2 million. Hunter (1987) has postulated that the rapid increase in sheep and goat numbers during this period was caused by the dramatic increase in wool and mohair prices. The population of sheep and goats reached its peak in 1931 when the total number of small stock units was nearly four million. After 1931 both sheep and goat numbers decreased. This was the period of the Great Depression when wool and mohair prices were very low. This period also coincided with a severe drought when large numbers of sheep and goats died. The drought also affected grain production such that farmers had to slaughter sheep and goats for food to compensate for the decreased grain production.

The sheep population declined continuously from 1949 until 1977 when it reached approximately a million. The goat population also hit its lowest level in 1977, and has thereafter increased. It seems both sheep and goat populations reached high peaks in 1984. It has been postulated that both sheep and goat numbers have been increasing as a result of improvement in wool and mohair prices (Musiyambiri, 1987).

The climate of Lesotho is generally subhumid, with warm summers and cool winters. The climate varies from semi-arid in the southeastern lowlands to mostly humid in the mountains. Altitude is an important factor affecting temperature in Lesotho. The highest average monthly temperatures occur during January and February while the coolest months are June and July. The cool temperate climate coupled with the high altitude makes Lesotho an ideal place for wool and mohair farming. The high altitude and cool temperate climate results in fine wool and mohair but fine wool and mohair is also attributed to poor nutrition and internal parasite stress. One measure of Merino wool quality is fineness which is measured in microns. Fineness is divided into superfine, fine, medium and strong. Superfine wool is 21 μ and less while fine wool is between 21 μ and 23 μ. Strong wool is greater than 24 μ. The Lesotho wool is predominantly superfine with 80 percent of the clip having an average fibre diameter of 20 μ and less. The RSA wools are predominantly fine with over 80 percent 21 μ and over. The Australian wools on the other hand are predominantly strong and New Zealand's are mostly cross-bred. Because most of the world wool production consists of strong wool there is good demand for the fine and superfine wools. The fine and superfine are used for blending with the strong wools in processing woolens.

Lesotho produces blue mohair known as the Basuto Long Blue Mohair. This type of mohair, like the superfine wools, is a result of altitude and temperate climate. The blue mohair is in great demand by the mohair spinners of the world, and thus commands a high price.

Sheep and goat breeding in Lesotho is seasonal. They are usually mated in autumn/fall (April/May). The lambing and kidding season is in spring (August/ September). The breeding performance of sheep and goats in Lesotho is low and can be attributed to the high incidence of infertility resulting from various causes: poor nutritional, old age, and diseases (Phororo, 1979). The average lambing and kidding rates in Lesotho are approximately 50 percent while in the RSA they are approximately 80 percent (Phororo, 1979).

The major problem facing the Lesotho wool and mohair industry is the crossbreeding of the non-merino with Merino sheep and the non-angora with Angora goats. Cross-breeding results in colored wool and mohair which fetch lower prices as compared to pure Merino wool and mohair. In order to improve the Lesotho breeds, pure-bred rams have been imported from breeders in the RSA. To augment the importation of Merino rams from the RSA, a Merino sheep stud was established in Quthing district in 1966 and another in Mokhotlong district in 1970 with the aid of the South African Wool Board. There are plans to establish an Angora goat stud in the

near future. Coupled with the importation of pure- bred rams from the RSA was a drive to do away with cross-bred rams. The drive started in the early 1930s when the Department of Agriculture advised farmers to castrate all their cross-bred rams. While cross-bred rams were being castrated the number of imported rams was totally inadequate to fill the needs of the country and farmers were therefore forced to hide their crossbred rams from government officers and to put them to the ewes at night (Uys, 1977).

The major sheep and goat diseases in Lesotho are parasite infestations. Sheep scab was prevalent in the period 1906 to 1930. Since 1935 it has almost been eliminated although an outbreak did occur in 1975. It has since been successfully eradicated with compulsory dipping of sheep and goats. There are 41 Livestock Improvement Centres (LICs) which are managed by the Livestock Department of the Ministry of Agriculture. The LICs provide advice to farmers on livestock management practices and breed improvement and provide veterinary and parasite control services (Phororo, 1979). There are approximately 200 dip tank areas located throughout the country. Each dip tank area is served by one small stock dip tank facility and covers approximately 10,000 ha. Each LIC covers approximately four dip tank areas or 40,000 ha.

According to the Lesotho 1980 Agricultural Census, the average number of sheep per small stock holding household was 27.9 while the average number of goats per small stock holding household was 18.3.

The marketing of wool and mohair involves shearing, grading/classing, packing, transportation and buying and selling. Shearing involves the shearing of wool from sheep and mohair from goats. Farmers are usually advised to shear wool/mohair at intervals of at least six-months but the best wool/mohair is of twelve-months growth. This is because the quality of wool/mohair is based on the length. Shearing can be done at home (kraal), at government shearing sheds or at traders' stations. Shearing at home is discouraged as the kraals are usually not clean and grading is not done. Shearing at home also means transporting wool and mohair on pack animals which leads to the wool and mohair being intermingled, matted and contaminated by hair from the pack animals.

In order to avoid contamination and mixing of wool with mohair, there are different shearing seasons for wool and mohair. The mohair shearing season starts in autumn (fall), beginning in March and extending into June, with April and May the heaviest shearing months. The wool season is in the spring, starting in late August and extending into January. Most sheep are shorn in October and December.

After the wool/mohair has been shorn, it is then graded. Grading involves putting together fleeces of similar type. Wool is usually classified by length, type and quality. The quality of wool is based on the fineness of the fibre. Wool type refers to whether the wool is Merino, cross-bred, colored or other. Lesotho wools are grouped

into 27 grades and almost 100 types.

Mohair is classed according to color and length with the best mohair being eight inches and over in length. Lesotho mohair is grouped into 17 grades and 40 types. As Lesotho wool and mohair are marketed through the RSA, the RSA marketing boards in collaboration with the government of Lesotho establish wool and mohair grades. Grading is done by classers who usually have grading certificates issued by the government.

After the wool/mohair has been graded it is then packed into bags or bales. In the early years of wool and mohair marketing, wool/mohair was simply jammed into jute bags without being graded. Nowadays wool/mohair from the same class is packed into one bale. Because many Basotho producers have small flocks of sheep and goats, wool/mohair from several producers may be packed into one bale.

Once the wool/mohair has been packed into bales it is then ready for transportation. Several transportation modes are used. In the early days pack animals, e.g. oxen, horses and donkeys, were used. Pack animals are still being used in remote places, especially in the mountain regions. The mode of transportation used depends on the location of shearing. If a farmer drives his animals to either government shearing sheds or trading stations, road and rail transport are usually used to transport the wool/mohair to the market place.

The most important aspect of buying and selling wool and mohair is how prices are discovered or the product is exchanged. The auction system of selling and buying of wool and mohair is the most commonly used. Wool is usually auctioned in the RSA ports of Durban, East London, Port Elizabeth and Cape Town. Most of the Lesotho wool is marketed through the port of Durban which is the nearest to Lesotho. Mohair used to be auctioned in East London and Port Elizabeth but since 1973 all mohair produced in Southern Africa is auctioned at Port Elizabeth. Once the wool and mohair are on the auction floors they are displayed in open bales where buyers freely inspect them. In recent times a system referred to as objective measurement has led to wool being sold by sample certificate while the product is not physically on the auction floors. Mohair is not amenable to objective measurement and as a result has to be sold by display only. Wool and mohair sellers usually have brokers who handle the wool and mohair on auction floors.

6.3 Structure of the Marketing System

The Lesotho wool and mohair marketing system can be divided into two distinct periods, 1870-1970 and 1971-present. During the period 1870-1970 the wool and mohair marketing system was dominated by private traders with hawkers and marketing co-operatives playing minor roles. The period 1870-1970 was termed the duo-trading system. The period 1971- present was marked by the introduction of the one channel

marketing system for both wool and mohair. It was also marked by government intervention in the wool and mohair marketing system. Government intervened with the establishment of a public corporation to market wool and mohair in competition with traders.

6.3.1 The Duo-trading System

In the period 1870-1970 the wool and mohair marketing system was dominated by private traders with hawkers and marketing co-operatives playing minor roles. It is not known when and how private traders first came to Lesotho, but when the first missionaries arrived in Lesotho in 1833 there was already a handful of traders in the country. The major factor which contributed to the development of trading in Lesotho was the opening of the diamond fields of Kimberley in 1867. It is argued that the sudden convergence of a great number of people in a barren and hitherto rarely frequented part of the RSA created an unprecedented demand for foodstuffs. Basotho responded to the demands of the mining camps by increasing grain and livestock production. Traders then began establishing more trading stations to supply the mining camps with grains bought from Basotho. At the trading stations, which were established in the major populated centres, traders sold consumer goods and bought farm produce. The major farm produce bought by traders were livestock, grains, wool and mohair. By the turn of the century wool and mohair were the major traded farm products as the trading of livestock and grains had become negligible.

Hawkers were itinerant traders who travelled from place to place selling and buying goods. Hawkers used ox-wagons/vehicles or pack animals. It can be argued that hawkers handled small quantities of farm produce as these were bulky. This suggests that the bulk of the traded farm produce was handled by traders.

Trading in both consumer goods and farm products seems initially to have been highly competitive with many small traders and hawkers competing. Entry into trading was relatively easy with the number of trading stations increasing from six in 1871 to 50 in 1873. The competitive trading structure was changed by the Gun War of 1880-81 between Basotho and the colonial administration. During the war, many traders were attacked by Basotho because they were seen as outposts of colonial authority. Many traders fled the country or sold their licenses. Some traders took the opportunity to acquire the abandoned trading stations. After the war, most trading stations were owned by a few traders. The concentration of the trading structure suggests that traders acquired both monopoly and monopsony powers. In the market in which they sold wool and mohair, farmers faced a single trader, a monopsonist. In the market in which they bought consumer goods, they faced the same single trader, a monopolist. The trading structure whereby one trader has both monopoly and monopsony power has been termed duo-trading, and the trader, a duo-trader.

The duo-trading structure was consolidated by several factors like transport and capital requirements. Transport was difficult, time-consuming and expensive owing to

the mountainous terrain of the country, while capital requirements and risk were high. In addition to these, traders pursued rent-seeking and restrictive practices aimed at consolidating and perpetuating their monopoly/monopsony position. These include restrictive licensing advocated by the Basutoland Traders Association (BTA) which lobbied the government to limit the entry of Indians and Basotho into trading. In addition, traders engaged in restrictive practices on farmers. The restrictions were aimed at limiting farmers to selling wool and mohair and buying consumer goods from one trader. The various restrictive practices have been dealt with in full in Hunter (1987), Selwyn (1980), Rantheba (1985), Mokitimi (1988), and Hunter and Mokitimi (1989).

In the late 1940s, agricultural marketing co-operatives were established to provide competition in the purchase of wool and mohair. By 1958, 14 co-operatives had been formed but never handled more than 10 percent of the clip. Private traders opposed co-operatives and sometimes practised predatory pricing against them. They also persuaded farmers not to patronize co-operatives. These practices together with financial and managerial problems within co-operatives led to their downfall in the early 1960s.

A theoretical model of a duo-trader was developed. The model suggests that although the trader had monopsony power in wool and mohair purchase, it was not in his interest to exercise the monopsony power. It would be beneficial for the trader to pay a price close to or perhaps exceeding the price that would prevail in a competitive market. On the other hand it was beneficial for the trader to take advantage of his monopoly power in the sale of consumer goods. This made sense because with the income gained from the sale of wool and mohair, farmers purchased consumer goods. The various restrictive measures by traders ensured that after a farmer sold his wool and mohair he spent the money in purchasing consumer goods form the same trader.

To validate the theoretical model, profits and marketing margins in both wool and mohair and consumer goods trading were examined. The model suggests normal and sometimes negative profits in wool and mohair and positive profits in consumer goods. It should be noted that profit levels and marketing margins should be used with caution because firm conclusions cannot be made about the market structure or performance of an industry on their basis alone.

The few studies that deal with the operations of traders in both farm produce and consumer goods provide indications of the level of profits realized from these products. Most of these studies describe the trading structure as either competitive or monopolistic and monopsonistic. Competitive trading structure implies normal profits while monopolistic/monopsonistic implies supernormal profits.

There are years when the marketing margin was positive and others when it was negative. It seems that before 1921 both wool and mohair marketing margins were narrow but positive. In 1921 and 1922 both wool and mohair prices collapsed such that

traders incurred losses. Wool and mohair prices collapsed again in 1929 up to 1933. Thus the early 1920s and the period 1929-33 are marked by negative marketing margins implying that during these periods traders were incurring losses in wool and mohair. With regards to the years with positive marketing margins, we cannot conclude that traders were realizing profits during these years without more detailed data which is unavailable.

The evidence from previous studies, on profit levels and marketing margins suggests that traders were not realizing profits in buying and selling wool and mohair but in selling consumer goods. The evidence on profit levels and marketing margins seems to fit with the theoretical model which suggests that a duo-trader will realize profits in selling consumer goods and not buying and selling wool and mohair.

6.3.2 The Present Marketing System

The current wool and mohair marketing system is a one-channel system. A one-channel marketing system means that there is only one broker, Boeremakelaars Koop BKP (BKB), for both the South African Wool Board (SAWB) and the South African Mohair Board (SAMB). The one-channel marketing system started being operational in 1971/72. Because Lesotho wool and mohair are sold through the two RSA boards, the BKB also handles the Lesotho clip. The one-channel marketing system also involves a two-payment system whereby the two boards determine floor prices and pay an advance payment before the wool and mohair are sold and a post-payment after they have been sold.

At independence in 1966 the Lesotho government felt compelled to respond to stock keepers' complaints of traders' exploitation with institutional reforms to the marketing structure. In 1973, the Livestock Marketing Corporation (LMC), a parastatal body, was established to purchase wool and mohair through government woolsheds. In 1975, the Lesotho Mohair Industries (LMI) was established to purchase mohair. The LMI sought to bypass the SAMB and sell mohair directly to European markets. Neither the LMC nor the LMI were successful due to problems such as undercapitalization, lack of personnel and transport, and poor management. In 1978, the activities of both the LMC and the LMI were terminated and their operations taken over by a section of the Ministry of Agriculture, the Livestock Products Marketing services (LPMS) which continues to operate today.

The present marketing system consists of two official outlets and one unofficial (and illegal) outlet. The two official outlets are government woolsheds and private traders while the unofficial outlet is smugglers.

Government Woolsheds

The Government operates approximately 90 woolsheds scattered throughout the

country. Government woolsheds are patronized by farmers belonging to Wool and Mohair Growers Associations (WGAs). In addition to marketing wool and mohair, WGAs are involved in improving wool and mohair production. Members are required to use rams approved by the Livestock Department of the Ministry of Agriculture and are not supposed to keep colored sheep and goats. Members are also required to dose and dip their animals regularly. Members of WGAs represent about 9 percent of wool farmers and 5 percent of mohair farmers. WGAs members own 23 percent of the sheep and 10 percent of goats.

Government woolsheds fall under the auspices of the Livestock Department but responsibility for various aspects of marketing is under the LPMS. The Livestock Department is responsible for maintaining the woolsheds, classing and despatching records to the LPMS. It is also responsible for the dispatch of cheques to farmers.

The LPMS does not purchase wool and mohair but acts as a marketing agent for farmers marketing through government woolsheds. The LPMS also provides regulatory functions including the inspection of private traders facilities, the maintenance of classing standards, training of classers, inspection of weighing scales, licensing of private traders, and the determination of traders prices and margins in conjunction with the Ministry of Agriculture. The LPMS has three regional offices in addition to its head office in Maseru.

Farmers marketing through government woolsheds get paid after the relevant documentation reaches the LPMS. Although the LPMS attempts to get cheques to farmers within a month, delays of up to 3 or 4 months are not uncommon. In most cases the causes of delays are beyond LPMS control. The delays are also caused by the fragmentation of responsibilities shared by several organizations e.g. The LPMS and the Livestock Department.

In the surveys undertaken by Swallow et al (1987) and Hunter (1987), farmers were asked reasons for marketing wool and mohair through government woolsheds. Approximately 60 percent said the LPMS paid higher prices than traders. The second reason listed by about 20 percent was convenience; the government woolsheds were either the only marketing outlet or the closest available. The major disadvantage of marketing through government woolsheds, listed by about 60 percent of the respondents, was slow payment.

Private Traders

With the introduction of the one-channel marketing system and the establishment of the LMC and LMI, the number of traders involved in the marketing of wool and mohair declined. Although the number varies from year to year, there are currently just over 40 private traders licensed to purchase wool and mohair. Traders prices, based on first payment prices announced by the SAWB and SAMB, are gazetted by government after a committee of traders and government officials agree on the permissible

marketing margin. The marketing margin makes allowances for transportation and handling charges, woolshed operation and depreciation, and commission (profit mark up). Since traders pay cash upon sale their marketing margin also includes an allowance for the cost of financing the purchase in advance of the sale in the RSA.

Despite the relatively few private traders involved in the marketing of wool and mohair, they shear about one-third of the animals owned by about one-third of stock keepers. Farmers marketing through traders tend to have smaller flock sizes than the flocks shorn at government woolsheds. One reason why traders, although few in number, handle relatively large quantities of wool and mohair is that they also purchase home-shorn fleeces. This is despite the fact that home-shearing is discouraged because of problems of contamination of fleeces with dirt and difficulties of classing.

Smugglers

It is very difficult, if not impossible, to obtain data on smuggling. It has been estimated that possibly less than 5 percent of wool and perhaps as much as 15 to 20 percent of the mohair may be smuggled. Low quantities of wool are smuggled relative to mohair because wool has a relatively low value whereas mohair has a high value per unit weight. Before government got involved in the marketing of wool and mohair and when hawkers were still purchasing wool and mohair, smuggling seems to have been done to avoid paying the wool and mohair levy. According to the two surveys, farmers have a variety of reasons for selling to smugglers. Farmers sell to smugglers to avoid costs of driving flocks to woolsheds or transporting home-shorn fleeces to market. This reason seems to apply particularly to small flock owners in remote areas and to those with a large proportion of colored animals. The other reason is that smugglers come to farmers and pay cash, which may be particularly desirable for those in need of immediate cash payment for emergency needs. One other reason is that smugglers purchase wool and mohair from stolen animals. Proof of ownership must be shown to market through official channels, but not through smugglers. The principal disadvantages of smugglers listed by survey respondents are unreliability and small payments.

6.4 The Performance of the Current Marketing System

The evaluation of the market performance of the Lesotho wool and mohair industry relies on the industrial organization approach of structure, conduct and performance. The performance indicators examined are marketing margins and profits, efficiency and equity.

6.4.1 Marketing Margins and Profits

Marketing margins and profits are indicators of market performance because they are related to both technical and pricing efficiency. However, marketing margins

and profits are not clear-cut indicators of market performance. High profits may reflect efficient operations implying a high level of technical efficiency rather than being caused by market imperfections. On the other hand, high profits may be caused by market imperfections. The same is true with regard to marketing margins. A high marketing margin may be a result of a high level of technical efficiency rather than inefficient pricing. A high marketing margin may also be caused by inefficiency in pricing e.g. monopoly. This implies that we cannot make definite conclusions on the performance of a market system on the basis of marketing margins and profits alone. Tentative conclusions on the performance of a marketing system on the basis of profit and marketing margins can be made with additional evidence on the market structure and conduct. This is because economic theory suggests relationships between market structure, conduct, marketing margins and profit levels.

Lesotho wool and mohair marketing margins consist of two parts. One part consists of marketing costs incurred within Lesotho while the other part is incurred in the RSA. Within Lesotho there are marketing costs pertinent to traders and WGAs. In the early 1980s, evidence suggests that the net price paid by LPMS and traders was almost identical. In 1982/83, farmers selling through traders received 64.8 percent of the gross wool price while those selling through government woolsheds received 66.3 percent. In the same year, farmers selling through traders received 77.8 percent of the gross mohair price while those selling through government involves received 88.8 percent. This does not imply that the two outlets were operating with equal efficiency, however, since many of the operating costs of the government woolsheds which include shed maintenance, staff salaries, and LPMS operating costs were borne by the government and not deducted from the gross wool and mohair payment as done for farmers selling through traders. If these costs were also deducted from farmers selling through government woolsheds, the net prices paid by LPMS would be much lower. This means that farmers selling through government woolsheds are subsidized by the government. For the 1980/81 season it was estimated that government provided a 20 percent subsidy to the farmers marketing through government woolsheds. Crees and Grimble (1988) estimated that in the 1980/86 season there was a 35 lisente/kg subsidy for farmers selling through government woolsheds. If these farmers had to bear these costs (as did their counterparts selling through traders) this price advantage would have been completely eliminated in wool and mohair. In addition, Crees and Grimble estimate that farmers selling through government woolsheds have a hidden 4 percent cost disadvantage in interest foregone because of delayed payment.

One of the reasons for government intervention in the wool and mohair marketing system was that it was believed traders were earning excessive profits from wool and mohair which is contrary to the evidence presented under the duo-trading structure. Since government intervention, private traders' profits from wool and mohair have been enhanced.

Firstly, the number of traders licensed to market wool and mohair has been reduced, which means that the few traders earn high profits, especially as they handle

substantial quantities of wool and mohair. In addition traders are highly concentrated; seven owned 72 percent of the trading stations handling wool and mohair in 1986. Although traders now face competition from government woolsheds, survey data suggest that these two outlets serve different kinds of clientele with different needs. Secondly traders now have a guaranteed commission or mark-up allowance by government. This is in addition to an allowance for all legitimate costs incurred in marketing.

6.4.2 Efficiency Consideration

Operational efficiency is concerned with cost-reducing alternatives and technologies for physically providing marketing services. The individual marketing firm (or any other firm) is said to be operationally efficient if its production function yields the greatest output for any set of inputs, given its particular location and environment. Thus operational efficiency is concerned with providing marketing services at the lowest cost given the factors of production (inputs) and level of technology.

In examining the operational efficiency of the current marketing system, it seems the government woolshed/LPMS outlet is less efficient than the private outlet of traders. As previously noted, until recently the prices paid to farmers using either government woolsheds or private traders were almost identical. Yet most of LPMS's costs were met by government subsidy. It should be noted that LPMS does not handle wool and mohair only. It also organizes livestock auction sales and facilitates hides and skins sales. Nonetheless, the operations of wool and mohair take a major portion of the LPMS budget. If 50 percent of the LPMS recurrent budget is allocated to wool and mohair functions and this is added to the expenditure incurred by the Livestock Department in maintaining woolsheds (woolsheds permanent staff, etc.), government subsidy to patronizing government woolsheds is approximately 52 lisente/kg. This works out to be 10-15 percent of the recent price for wool and 5-15 percent of the recent price for mohair. Were these costs borne by farmers the price advantage of the government woolsheds/LPMS would be entirely eliminated and it is likely that few farmers would patronize this outlet.

With the exception of temporary classers who are hired only during the shearing season and self-employed, all government woolshed employees are full-time staff. Most of the government woolsheds are used a few months a year. The busiest woolsheds are usually used for 8 to 9 months a year. During the remaining months the woolsheds are idle and each woolshed's 2-3 permanent employees have little to do. On the other hand not only do private traders usually have a longer shearing season but also have greater flexibility to reassign their facilities and employees to other tasks during the idle months. Thus, private traders appear to use labour more efficiently than government woolsheds. The private trader outlet is also efficient because its overhead costs are more widely spread and are lower per kilogram. This is because a few private traders handle relatively significant volumes of wool and mohair which means each trading station on the average handles a much higher volume than a government woolshed.

6.4.3 Equity Considerations

Government woolsheds serve slightly more than a third of the wool and mohair farmers in the country. The flocks of farmers patronizing government woolsheds are rather larger than average and much larger than those farmers selling elsewhere. As pointed out earlier, farmers patronizing government woolsheds have a number of marketing and overhead costs subsidized by government and, in addition, have recently received higher net prices than farmers marketing through private traders. Thus government subsidies are going to larger farmers. This would seem undesirable from the standpoint of equity.

6.5 Conclusions

It has been shown how the Lesotho wool and mohair marketing system evolved from the duo-trading structure to the present system whereby both the government and the private sector are involved. Under duo-trading evidence suggests that private traders held monopsony/monopoly position in the market and were able to earn monopoly profits from the trade. On both theoretical and empirical grounds, however, there are reasons to believe that this was not earned in the wool and mohair side of the transaction, but in the sale of consumer goods.

After independence, the Government responded to farmers' allegations of exploitation by private traders with the establishment of public corporations to handle wool and mohair. The public corporations were not successful. All reforms to the wool and mohair marketing system have been made on the premise that the wool and mohair marketing system needed to be more competitive. The major complaint was that private traders were earning excessive profits from wool and mohair. It has been shown how government intervention now guarantees traders a profit from wool and mohair sales where none was guaranteed under duo-trading.

6.6 Policy Implications

A set of policy implications for the Lesotho wool and mohair marketing system follow from these conclusions. Firstly, the fragmented responsibility for marketing whereby some functions are undertaken by the Livestock Department and others by LPMS should be ended. This leads to payment delays, lack of proper accountability and, ultimately, to inefficiency. Unifying these functions under LPMS would substantially lessen these problems. Steps should also be taken to fully charge users of government woolsheds for the services provided to them. This would eliminate most of the inequity of government subsidies being paid to larger, and more prosperous, stockowners.

Secondly, serious considerations should be given to returning much of the wool

and mohair marketing to the private sector. This is because government or parastatal operated woolsheds cannot operate at as low a cost as private woolsheds. The government would still have a role to play in the wool and mohair marketing system, which should be concentrated more on regulating, monitoring and facilitating the efficient operation of the private marketing system. In addition to the regulatory functions presently undertaken, government should:

(a) provide a regulatory function to police anti-competitive and dishonest practices and to ensure that minimum standards in grading and packaging are maintained,

(b) provide a monitoring function to gather and analyze data relating to wool and mohair production and marketing so as to keep the industry abreast of trends and developments and to provide guidance to government's livestock development programmes,

(c) operate a market information service to keep farmers appraised of market prices,

(d) train and certify wool and mohair classers, and

(e) represent Lesotho's interests on the South African Wool and Mohair Boards, in STABEX determinations, on the International Wool Secretariat, the International Mohair Association and other relevant bodies.

Thirdly, the returning of wool and mohair marketing to private traders may pose a problem to farmers in remote locations not being served, particularly in areas where, for reasons of high cost, private traders are unwilling to operate. In this regard, the government may find it justifiable to operate such marketing outlets.

Fourthly, consideration should be given to relicensing hawkers. Survey data suggest that many of the functions currently performed by smugglers were previously performed by hawkers. Re-licensing such buyers to purchase wool and mohair should lessen much of the attraction of smuggling by providing legitimate competition to smugglers.

Finally, the competitiveness of any marketing system is enhanced by knowledgeable producers or consumers. In this regard, continued training of wool and mohair producers in standards of classing can only help to improve their competitive bargaining position vis-a-vis buyers and help them to guard against being taken advantage of.

7

CONCLUSIONS AND IMPLICATIONS

Gary Storey

The conclusions and implications that were drawn from much of the research has already been incorporated in each of the chapters. Therefore the purpose of this chapter is to draw broader conclusions and implications for agricultural development in Lesotho and other developing countries from the research that was carried out. A second purpose is to outline and discuss areas for further research for the role of markets and marketing in developing countries and marketing in Lesotho. There is also a discussion of the process under which further research should be carried out.

7.1 General Conclusions

The study of Agricultural Marketing in Lesotho was supported and carried out because it was felt that the failures to develop an effective and efficient marketing system was impeding if not in fact blocking agricultural development in Lesotho. The overall purpose of the study was to test this premise and to determine in what ways marketing could be improved. Based on the work that was carried out on the several agricultural sub-sectors and commodities, it can be concluded that in fact the failures of effective markets to develop has hampered growth in agriculture and hence the overall development of the economy. The problem is seen to be both absolute as well as relative.

First the marketing system in Lesotho must be compared to that in the Republic of South Africa (RSA). In relative terms the existence of well developed markets and marketing systems in the Republic of South Africa (RSA) is seen to be both an advantage and a disadvantage. Given the trade agreements between Lesotho and the RSA, Lesotho finds it difficult to introduce protection for its agricultural sectors. Thus prices of agricultural products in Lesotho are largely determined by the price levels in the RSA which in turn are determined by the various marketing arrangements that exist in the RSA and its agricultural policies. As explained in Chapter 2, where the RSA has developed an efficient agricultural marketing and production system the price levels have not been sufficient for the agricultural sector in Lesotho to generate the internal capital to both develop its marketing system and at the same time induce the adoption of new technology at both the farm and marketing levels. This has created a situation where Lesotho has become dependent on the RSA for a growing percentage of its food supply. In certain respects this has been an advantage for consumers as there is a readily available supply of food at price levels that Lesotho's agricultural sector could not likely provide if it had to be more self sufficient. But as stated, it is a disadvantage to farmers who require higher prices to provide the profit incentives for investment in new

technology necessary for increased output. For this reason the existence of efficient markets in the RSA have likely mitigated against development in Lesotho. On the other hand for certain products that Lesotho exports such as wool and mohair the well-developed marketing system is an advantage, as Lesotho can access world markets along with wool and mohair produced in the RSA for export. The RSA markets are an advantage as well for the commodity where Lesotho can develop a comparative advantage and can produce at a surplus level.

In absolute terms and even without the RSA next door the marketing system for most agricultural products especially in the mountainous regions is either non existent or poorly developed. Whereas the lowlands are reasonably well served by paved roads the roads in the mountain regions result in costly transportation. In certain cases, marketing although an important component for development other factors are more important.

The most obvious case is livestock, especially cattle, sheep and goats that are produced on the rangelands of Lesotho. Thus a second major conclusion of the study was that a comprehensive approach must be taken for the solution to Lesotho's increasing degradation of the range and the low productivity of its livestock. While an efficient marketing system is important, it alone will not solve the current problems. In the past, several development projects have focused on developing more effective marketing arrangements as the solution. However in one telling example, opportunities were provided to market unproductive livestock, but the farmers did not respond. What could easily have been put down as economic irrationality on the part of the owners can be explained as fully rational behavior when analyzed in the context of an open access model of the range. The study showed that even with low returns from seemingly unproductive animals the low marginal costs of maintaining these animals on the range did not warrant marketing them. In other words marginal returns exceed the marginal costs. This has serious consequences for stocking levels and hence the quality of the range itself. Since individual stock owners do not face the full costs of the impact of the excess livestock that they contribute to the range, new institutional arrangements must be found to deal with the problem. Although the work did not provide for a definitive solution, the study results suggested that a system of taxation and increased education would be necessary components of both short-run and long-run solutions to the problem. Given that Lesotho maintains its current tenure arrangements which are common ownership, or use of range resources, it is important to strengthen the institutional behavior and rules that will result in a cooperative rather than an individualistic approach to decision making in deciding stocking rates. However, it may also be necessary to ensure that individual stock holders face the externality costs of their stocking decisions. Taxation of livestock is one method of doing this.

The research on vegetable marketing, unlike the situation for livestock, point to the failure to develop an effective marketing system for both products as well as inputs as the major reasons for the dependency of Lesotho on the RSA for a high percentage

of its vegetable requirements. Several studies have shown that Lesotho should have a comparative advantage in the production of certain fruits and vegetables given its water, land and labour availabilty. But the RSA has developed a very efficient set of municipal produce markets that do not exist in Lesotho. It means that wholesalers from Lesotho can much more readily obtain produce from these markets than they can by seeking out produce from the widely and sparsely distributed farmers who attempt to grow vegetable products for the market. In terms of the more recent contributions of Williamson, the answers are that transaction costs are much higher in Lesotho than they are for wholesalers obtaining produce grown in the RSA. The general conclusion is that without the development of an effective and efficient marketing system and as long as there are limited constraints on importing produce from the RSA, vegetable and fruit production is unlikely to develop in Lesotho. It will require a concerted effort on the part of the government working closely with farmers and businesses that are engaged in the trade to foster an expanded vegetable industry. A full systems approach is called for including an understanding of the conditions under which farm households will engage in vegetable production.

The project carried out a considerable amount of work on the dairy sector. In the first phase of the project the work concentrated on policy and in particular the market and trade relations between Lesotho and the RSA for dairy products. It is the results of this research that have largely been reported in this document. In the second phase of the project research was carried out on dairy production and other aspects of marketing. The results of this latter research are not reported in this document but are reported elsewhere in ISAS publications. As was argued previously, Lesotho had developed a dependency on the dairy industry in the RSA for a large percentage of its commercial supply of dairy products. As a result of the research it was concluded that to break the dependency would require some control over imports of RSA dairy products and the development of efficient dairy production in Lesotho as well as an efficient marketing system. This prompted the project to focus on costs of dairy producution in the second phase of the Marketing study.

The study examined the marketing system for wool and mohair from a historical as well as a current perspective. Historically the marketing of wool and mohair had been in the hands of private traders prior to 1971 and elements of monopoly and monopsony characterized the industry. The study concluded that this likely had negative consequences for farmers in selling their wool and mohair and in buying goods and services. After independence, the government introduced two parastatals to market wool and mohair; both failed and were replaced by the Livestock Products Marketing Services (LPMS), a branch of the Ministry of Agriculture. It is not a monopoly in the sense that producers have the choice of selling to private traders or to the LPMS. However there is controversy over the performance of the LPMS. One conclusion of the study and recommendation is that much of the actual marketing should be returned to the private sector and the government should instead concentrate on developing the necessary information and institution to effectively monitor and hence regulate the

industry. If this course is followed there are certain conditions that must be met in order to ensure market efficiency.

North has related the development of institutions to society's economic development. He states that not all institutional changes lead to development. Reusse, for example, has agued that in the case of agriculture where certain developing countries have been abandoning their parastatals in favour of the private sector, it is necessary that the governments of these societies be abie to develop the institutional arrangements that result in allocative and operational efficiency and distributional efficiency and equity. This raises a very important question as to how such appropriate regulations are to be developed and more broadly how the process of building the right institutional arrangements can be fostered.

One approach suggested recently by Fleming and Spriggs is the creation of a transparency institution. One role of such an institution is to increase society's awareness of implications of changes in various institutional and related arrangements. Where they exist they have operated as independent think tanks or independent commissions set up by government on a temporary basis or more permanent bodies such as a university. One of the critical factors is that the results of these institutions can have a bearing on public sector decisions. In the case of the Lesotho marketing project the steering committee that was established provided the necessary link so that the research work of the project was directed in such a way that the results of the research would be effectively used by policy decision makers. This point will be further elaborated on later in this chapter.

One issue that has stood out from the research and discussed above is the need to develop the appropiate marketing arrangements and systems. A very important and overall general conclusion is that it would be wrong to attempt to generalize on the type of marketing arrangement that is correct for each agricultural sub-sector and commodity. The government must selectively decide for each sub-sector what is the appropriate structure and arrangement given that area's stage of development and the type of market arrangements in the RSA. This can only be determined by careful research and analysis. Although the research carried out by the project provided some of the answers more research is clearly needed. This raises questions not only for the areas of research but the manner in which this research should be carried out. It is also essential that the decision making process in government is receptive to the research and the implications it has for policy development. Government and research objectives should be consistent and coordinated.

7.2 Implications for Further Research

As discussed above the Marketing Project established a steering committee of government officials who were directors of marketing and research units in the Ministry

of Agriculture as well as officials and policy advisors elsewhere in the government. This linked the university through the Marketing Project in ISAS with the government. This was an ad hoc arrangement that was established for this project only. Results in terms of the awareness of government officials and others responsible for actual marketing policies and arrangements would suggest it was effective. The problem is that it was ad hoc. What would appear to be needed is a more permanent body or arrangement between the government and the agencies that can provide not only the research but the development of appropriate institutions for economic development. This would suggest the formation of a transparency institution to fit the Lesotho situation.

It can be argued also that the overall goal of such an institution should be economic development itself and that the direction of the research be mission-driven to specific targeted goals of creating new wealth in Lesotho through the development of Lesotho's human and natural resources. As discussed in Chapter 2, it is necessary as well to determine the correct approach to education and training to serve Lesotho's economic and social development. It is through education that people develop the orientation to provide the broad entrepreneurial functions for the economic and social change.

What is needed further is for the research and associated development activities to follow a systems approach. This implies that the research determine in a comprehensive manner what is required for increased productivity in the sector. This applies to every area that was researched in the project but it is particularly applicable to the livestock/range and vegetable areas. For these reasons the institutional arrangements established must include the private business and government agencies that are engaged in production and marketing functions as they are components of the system.

Whereas the above has dealt with the overall process for further research there are a number of specific areas for further research that are required. The following lists some of the more obvious and important.

In the livestock area it is important to determine how the changes in the markets for livestock products and production would affect the ownership and hence markets for land and land rights. One assumption of the research on the establishment of grazing associations was that increased commercial market opportunities would stimulate increased demand for private rangeland tenure. This is consistent with the property rights view of institutional change. But there are many other things that affect institutional change, and given Lesotho's long history of common tenure of the range, its chieftancy system and other institutional behavior, it is not obvious that the demand for private ownership of the range would result or that it would in Lesotho's case even be desirable.

What are the de jure and the de facto legal foundations for trade in the country?

Further, what institutional changes are reguired to foster improved trade such as a reduction in transaction costs? What effect can government actions have on the legal foundations as well as society's behavior that will stimulte greater specialization and hence productivity and trade? Results of this research can have important implications for liberalization of the economy which would in all likelihood require increased reliance at least initially on private sector firms in the RSA.

Given the dependency that Lesotho has with the RSA it is important to determine the main areas where Lesotho has an opportunity for accumulating surplus and creating wealth. This would allow Lesotho to concentrate its development efforts in selected areas and thus increase the likelihood for successful economic development.

As Lesotho must develop its marketing infrastructure so that it can match the efficiency of RSA markets, it is important to first determine more fully how the current thinly-traded and spatially separated markets operate. What is the nature of the contractual relations that exist in these markets and what is necessary to transform these relations so that transaction costs can be reduced?

It is essential that new productive technology be transferred into Lesotho. Research on agriculture at both the primary production as well as at the marketing levels is needed to determine the process that will allow this to occur. This needs to be determined within the framework of the new institutional arrangements that were previously discussed. As outlined in Chapter 2 it must be recognized that production and marketing are highly interdependent processes. They must evolve together.

Other areas for research could be added, but this will suffice to delineate some of the more important. What is critical is that the research into agricultural marketing and related areas be continued and that research capacity be improved. This project has helped to do this in several ways: first, through the manner in which the research was carried out between the university and the government; second, through the actual research undertaken; and finally, and possibly most importantly, the education and professional training of Basotho agricultural economists all of whom are currently engaged in either research and/or teaching in Lesotho or are obtaining further education.

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APPENDIX A

The Lesotho Agricultural Marketing Research Project

A.1 Description of the Project's Structure and Operations

The following provides a description of the overall Lesotho marketing project focussing on the process that was followed and listing the major publications, seminars, etc. that were produced.

A.2 Research Subject Areas

The final project proposal and memorandum of grant conditions specified a number of subject areas on which research would be conducted during the course of the project. Consultations, meetings, and a broad literature review were conducted in the early stages of the project to establish the relative priority to be given to each subject area. Senior staff at the University, the Ministry of Agriculture's Research, Planning, Range and Livestock Divisions, the Central Planning Office, and the Office of the Prime Minister were interviewed. Initial priorities were assigned on the basis of: current and potential importance of the sector to the Lesotho economy; current and projected importance of the sector to development planning and development projects; the state of the current base of information about the sector; priorities established by the Research and Planning Divisions of the Ministry of Agriculture; and suggestions contributed by The National University of Lesotho (NUL) and Ministry of Agriculture personnel. These initial priorities were in turn presented to the Steering Committee. The Steering Committee approved a slightly modified list of priorities. A report justifying the priorities received IDRC approval and support.

Research priorities were: (1) production and exchange practices of livestock owners; (2) cattle exchange; (3) marketing of fresh vegetables; (4) marketing of dairy products; (5) marketing of wool and mohair; (6) marketing of grains; and (7) marketing of hides and skins.

A.3 Research Procedure and Results

Concurrent with the determination of research priorities was the development of a general approach to guide research in each problem area. This approach is outlined in an appendix to the first technical report published by the project entitled "The Marketing System for Fresh Vegetables in Lesotho." Three general stages of marketing research were specified. The descriptive stage establishes the foundation of information upon which further diagnostic and perspective stages can be conducted. The diagnostic stage involves diagnosis of particular problems or constraints in the marketing system. The prescriptive stage involves the analysis of alternative policy options.

A.3.1 Production and exchange practices of livestock owners

Resources were devoted to analysis of the production and exchange practices of Basotho livestock owners throughout the duration of the first phase of the project. All research conducted by the project in this area was conducted jointly with the Research Division of the Ministry of Agriculture and the USAID-funded Washington State University Farming Systems Research Project. Additional financial support was provided by a U.S. $10,000 grant provided by the Southern African Council for Coordination of Agricultural Research (SACCAR) to 'Mabaitsi Motsamai, head of the Marketing Section of the Research Division. Swallow acted as joint supervisor of the grant.

The descriptive phase of this research involved a review of literature as well as a detailed survey of 537 livestock-owning households. Both national and international livestock literature was reviewed throughout the duration of the project. Dr. Ray Brokken, collaborating researcher with the Farming Systems Research Project, is an expert on the economics of U.S. livestock and was able to recommend relevant literature that had been published in the United States. Contacts were established with the International Livestock Centre for Africa located in Addis Ababa, Ethiopia. The project was able to access the excellent library resources at ILCA and became a recipient of regular mailings from ILCA. Swallow, Motsamai and Brokken conducted informational interviews with specialists in cattle production, small stock, rangeland ecology and livestock economics during a brief visit to ILCA headquarters in 1985. The information and advice gleaned from these interviews helped to define future research.

A survey of Basotho livestock owners was conducted between July and September of 1985. A detailed questionnaire was developed to gather information on all aspects of livestock production, marketing and distribution. The questionnaire was first developed in English and translated into Sesotho by Agricultural Marketing Project staff -- Mokitimi and Ngqaleni (nee Mpemi) and Research Division staff - Moletsane and Motsamai. Lyulph Hesling, advisor to the Planning Division of the Ministry of Agriculture, assisted in the design of the sample frame and the sampling method. The country was stratified into six geo-climatic zones -- northern lowlands, southern lowlands, foothills, Senqu River Valley, less remote mountain areas, and more remote mountain areas -- and three cluster areas were selected within each stratum. Size sampling was used to select villages from each cluster area. Thirty livestock-owning households were systematically selected from each sample village. A total of 537 households were interviewed.

The translated version of the final questionnaire was 68 pages in length. It was not pre-coded. A small pre-test did not reveal problems that warranted changes. Eight enumerators were employed to conduct the survey. Six of the enumerators were economics students from the National University. A week-long training session, concluding with a pretest of the questionnaire, was held at the University for the enumerators.

An involved protocol was followed in preparing the sites to be surveyed. Letters were first sent to District Commissioners and District Agricultural Officers in the nine districts in which the survey was to be conducted to provide information about the survey and to gain official sanction. Personnel from the District Agricultural Offices, and local livestock agents, escorted survey supervisors to the selected villages and made introductions to village chiefs. Lists of households in the villages, survey dates, and accommodation were arranged with the village chiefs. All administrative and extension personnel were invariably congenial and cooperative with survey supervisors.

Each interview required approximately two hours to complete. With eight enumerators and three supervisors -- Motsamai, Sopeng and Moletsane -- the survey was usually completed at each village within two days. Survey supervisors checked completed questionnaires while the enumerators administrated the surveys. Travel time occupied a number of additional days.

Coding commenced upon the completion of the survey in September. A coding book was developed and continually updated during the course of coding. Sopeng supervised a crew of 12 coders and checkers for the six month period necessary to the code the survey. Part-time data entry persons entered data from coding sheets into IBM-compatible computers using the EDLIN program. Computer consultant John Hunter was hired to manipulate the raw data into SSPS-PC program files and to generate descriptive statistics.

The computer consultants were able to make some data available for preliminary analysis by March 1986, but the complete data set was not available for analysis until August of 1986. The descriptive survey results were summarized in tabular form. The final version of the survey report was published in May of 1987.

Swallow, Brent M., 'Mabaitsi Motsamai, Limpho Sopeng, Ray F. Brokken and Gary G. Storey. 1987. A Survey of the Production, Utilization and Marketing of Livestock and Livestock Products in Lesotho. Institute of Southern African Studies Research Report No. 17, National University of Lesotho and Research Division Report RD-R-81, Ministry of Agriculture and Marketing, Roma and Maseru.

The descriptive and perspective stages of research into the production and exchange practices of Basotho livestock owners were conducted throughout 1986 and 1987. Historical data, data from the survey of livestock owners, unstructured interviews, the results of a survey of butcheries conducted by the Research Division, and a thorough review of national and international literature were important inputs into the diagnostic and prescriptive research. There was keen interest in this research both inside and outside of Lesotho's borders. Well attended seminars were held at the National University of Lesotho and at the Ministry of Agriculture. A brief presentation was also delivered to a meeting with the Advisor to the Ministry of Agriculture and the directors of the Livestock and Range divisions. In February of 1987 Brent Swallow

presented seminars at the International Livestock Centre for Africa in Ethiopia, the International Food Policy Research Institute, and the World Bank in Washington D.C., Virginia Polytechnic Institute and State University and the University of Saskatchewan. The mimeographed paper presented at those seminars was entitled "An integrated model of the Lesotho livestock-range complex." The major document that summarizes the diagnostic and prescriptive research is

Swallow, Brent M., Ray F. Brokken, 'Mabaitsi Motsamai, Limpho Sopeng and Gary G. Storey. 1987. Livestock Development and Range Utilization in Lesotho. Institute of Southern African Studies Research Report No. 18, National University of Lesotho and Research Division Report RD-R-82, Ministry of Agriculture and Marketing, Roma and Maseru.

A.3.2 Cattle marketing

The descriptive and diagnostic phases of the cattle marketing research proceeded simultaneously. A preliminary review of the Lesotho literature related to cattle marketing suggested that interest in cattle markets was more concerned with the relationships between cattle marketing and the entire livestock/rangeland complex than with the efficiency the cattle marketing system per se. Also suggested in that review were strong disagreements regarding livestock owners' motivations and behaviour regarding the exchange of cattle. As a result, it was deemed necessary to develop and review theory simultaneously with the collection and analysis of descriptive information. Also, data on livestock owners' exchanges of cattle collected in the survey of livestock owners were not available for preliminary analysis until March of 1986.

Research in cattle marketing was also conducted in cooperation with the Research Division of the Ministry of Agriculture. Mokitimi accumulated historical information on the structure of formal cattle marketing, on Lesotho livestock populations, on the numbers of animals marketed through various market outlets, imported and exported for various years since 1830. Information on the average weight, numbers and prices of cattle sold at cattle sales arranged by the Livestock Products Marketing Service (LPMS) was collected directly from the LPMS. A number of auction sales were attended by project staff. The newly opened National Abattoir-Feedlot Complex was also visited by project staff and informational interviews conducted.

Cooperation between the Agricultural Marketing Research Project, the Research Division, the Livestock Products Marketing Service, and the National Abattoir-Feedlot Complex made possible an analysis of the death and weight losses incurred in trekking animals from the auction sales points to the Abattoir-Feedlot Complex in Maseru. To provide input into planning for the opening of the National Abattoir, the Research Division of the Ministry of Agriculture conducted a survey of 65 lowland butcheries. Unpublished data from the survey were made available. Perhaps most importantly, preliminary data from the livestock owners' survey was analyzed. These data provided the first quantitative picture on the exchange of cattle by Basotho.

Diagnostic and prescriptive research on cattle marketing relied heavily on a theoretical framework of livestock production and exchange. This framework, the capital asset model, was supported by historical and financial analyses of the livestock sector and by analyses conducted in other Southern African countries. Implications of this framework differ greatly from those implied by the theoretical framework that had previously dominated the livestock development literature in Lesotho. Implications of this framework prompted strong interest in Lesotho. A seminar was conducted at the Range Division of the Lesotho Ministry of Agriculture and extensive consultations were held with other researchers studying cattle marketing. The technical report was used as the basis of two articles in international publications of the International Livestock Centre for Africa and the Southern African Development Coordination Conference Soil and Water Conservation Unit.

Swallow, Brent M., None Mokitimi and Ray F. Brokken. 1986. Cattle Marketing in Lesotho. Institute of Southern African Studies Research Report No. 13, National University of Lesotho and Research Division Report RD-B-49, Ministry of Agriculture and Marketing, Roma and Maseru.

Swallow, Brent M. 1986. "Cattle Marketing and Development in Lesotho." Splash: Newsletter of the SADCC Soil and Water Conservation Coordination Unit.

Swallow, Brent M. and Ray F. Brokken. "Cattle Marketing Policy in Lesotho", ALPAN, Network Paper No. 14, April, 1987.

A.3.3 Marketing of fresh vegetables

Research into the marketing of fresh vegetables most clearly followed the descriptive-diagnostic-prescriptive stages. The first report produced by the project, in April 1986, was a description of the marketing system for fresh vegetables. This report was co-authored by Malijeng Ngqaleni and Brent Swallow at the time that Ngqaleni was a research assistant for the project. Later Ngqaleni followed up this descriptive research with diagnostic and prescriptive research in the M.Sc. thesis she completed in 1989.

At the initiation of the study very little information had been compiled on vegetable production, marketing, consumption or inputs in Lesotho. The first step in collection of this data involved visits to each of Lesotho's ten districts. The officer responsible for horticultural extension, the District Crops Officer or District Horticultural Officer, was interviewed in each district. These agents were generally able to provide listings of projects, institutions, communal gardens, and the largest commercial vegetable producers operating in their jurisdictions. Survey data summarized in a number of recent reports were used to augment information provided by the extension agents. Two districts had active associations of horticultural producers. District agricultural agents arranged interviews with managers of projects, state farms, members of horticultural producers' cooperatives, and farmers. Information on projects and state farms was gathered from these interviews and from published documents.

Prior to joining the Agricultural Marketing Research Project, Ngqaleni had been employed by the Berea District Agricultural Office. This office had an excellent program of extension and support for vegetable producers in the District. The district also had a very active association of vegetable producers, particularly its chairman. Association members were particularly forthcoming with information about their production and marketing operations. Ngqaleni and Swallow were invited to attend the 1986 annual meeting of the association. Seminars reporting the descriptive results were held at the Research Division of the Ministry of Agriculture, the Lesotho Agricultural College, and an women's vegetable production cooperative.

On subsequent visits an enumeration was made of all wholesalers and retailers of vegetables in Lesotho's urban areas. Informational interviews were conducted with many of the largest vegetable traders. These interviews assisted in the understanding of the structure of the Lesotho and South African markets.

Published and unpublished secondary data from the Bureau of Statistics, the Food and Nutrition Coordinating Office, the Research and Planning Divisions of the Ministry of Agriculture, and Customs were drawn upon in an attempt to quantify the vegetable supply-disposition position in Lesotho. Published data on agricultural prices from Lesotho and South Africa were used to estimate marketing margins in Lesotho, Johannesburg and Bloemfontein.

The following report summarizes the descriptive research:

Swallow, Brent M. and 'Malijeng Mpemi. 1986. The Marketing System for Fresh Vegetables in Lesotho. Institute of Southern African Studies Research Report No. 10, National University of Lesotho.

The next phase of research on vegetable marketing was carried out as part of M. Ngqaleni's M.Sc. dissertation at the University of Saskatchewan.

Malijeng T. Ngqaleni. "A Vertical Systems Analysis of Vegetable Marketing in Lesotho", Unpublished M.Sc. Dissertation, Dept. of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 1989.

The methodology and data collection problems are adequately described in Chapter 4 and are not repeated here.

A.3.4 Marketing of dairy products

The research on the dairy industry in the first phase of the project was carried out largely as part of Mr. Motsamai Mochebelele's M.Sc. dissertation:

Motsamai T. Mochebelele. "An Economic Analysis of the Lesotho Dairy Industry: A Spatial Equilibrium Model", Unpublished M.Sc. Dissertation, Dept. of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 1987.

However, in addition to the above dissertation, a survey of retail outlets has been carried out in conjunction with the dairy plant. The survey was sponsored by the Canada/Lesotho Dairy Development Project. The methodology and results of this survey as well as the methodology for the dissertation are adequately described in Chapter 5. As with the livestock research, the work on dairy was closely coordinated with the dairy plant and Livestock Division of the Ministry. Several in the Division and dairy plant, in particular Victor Montsi and Ross Lister, provided data and advice for the project.

A.3.5 Marketing of wool and mohair

One part of the research on wool and mohair was carried out as part of Mr. Mokitimi's M.Sc. dissertation.

None L. Mokitimi. "An Economic Analysis of the Lesotho Wool and Mohair Marketing System". Unpublished M.Sc. Dissertation, Dept. of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 1988.

The methodology for the study primarily followed the industrial organizational structure-conduct-performance paradigm. However, it was developed in a dynamic-historical approach where the wool and mohair industry was examined over the period 1870 to 1986.

The project provided data and limited resource support for the research conducted by John Hunter. The WSU Farming Systems Research Project and the LCRD Project provided the majority of support for J. Hunter. The Agricultural Marketing Research Project provided some transportation and research assistance for Hunter's work. This appears as:

J.P. Hunter. The Economics of Wool and Mohair Production and Marketing in Lesotho. Research Division Report RD-R-80, Ministry of Agriculture, and Institute of Southern Africa Studies Report No. 16, The National University of Lesotho, 1987.

A.3.6 Marketing grains, pulses and asparagus

A limited amount of time was devoted by project personnel to a descriptive analysis of grain and pulse marketing in Lesotho. Previous reports and personal interviews with the managers of Lesotho Flour Mills, the Basotho Fruit and Vegetables Cannery, and Ministry of Agriculture staff provided information used in describing the

marketing systems for grains and asparagus. A paper describing the marketing systems for grains, pulses and vegetables was prepared for the proceedings of the ECA/FAO Group Consultation on Technical Cooperation Among Developing Countries, for Food Marketing Improvement in Eastern and Southern African countries, held at Arusha Tanzania in November 1985. This paper was redrafted and published as:

Brokken, Ray F., Brent M. Swallow, 'Mabaitsi Motsamai, and 'Malijeng Mpemi. Marketing Grains, Pulses and Vegetables in Lesotho. Institute of Southern African Studies Research Report No. 12, National University of Lesotho and Research Division Report RD-B-47, Ministry of Agriculture and Marketing, Roma and Maseru, 1986.

A.3.7 Marketing of hides and skins

The Research Division, with support from the Farming Systems Research Project, hosted a symposium on hides and skins marketing. Swallow presented a short paper on the history of hides and skins marketing and was rappatour for the symposium. The proceedings of the conference were published as:

Motsamai, M. and R. Brokken (Editors), Lesotho Hides and Skins Marketing Symposium. Research Division Report RD-R-71. Ministry of Agriculture, 1986. Maseru.

A.3.8 Miscellaneous

A workshop was held in 1988 where much of the research from the first phase of the study was presented to government and industry personnel. Papers were presented by N. Mokitimi, G. Storey, M. Mochebelele and N. Ngqaleni. The proceedings were published as:

Mokitimi, N. and M. Mochebelele, Agricultural Marketing and Policy Development in Lesotho, Institute of Southern African Studies, National University of Lesotho, 1988.